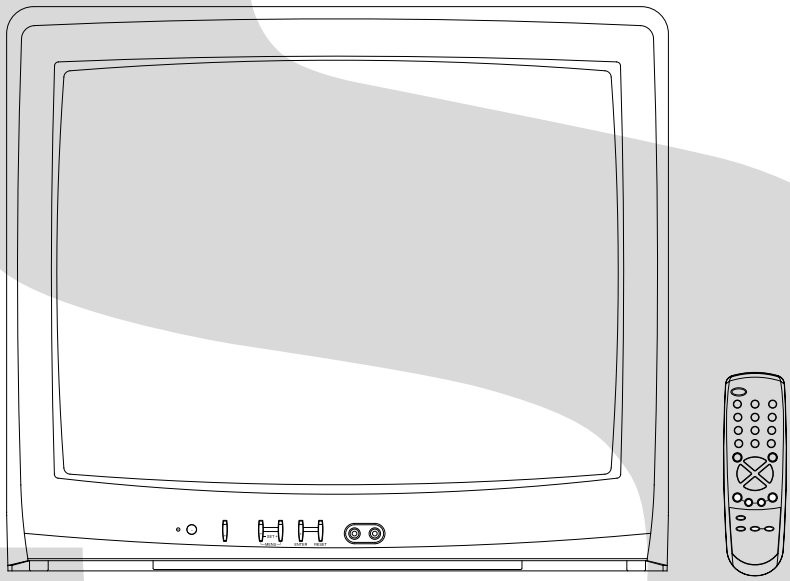
TOSHIBA

FILE NO. 050-200409

# SERVICE MANUAL

# COLOR TELEVISION

# 19A24



DOCUMENT CREATED IN JAPAN, Mar., 2004

# SERVICING NOTICES ON CHECKING

### 1. KEEP THE NOTICES

As for the places which need special attentions, they are indicated with the labels or seals on the cabinet, chassis and parts. Make sure to keep the indications and notices in the operation manual.

### 2. AVOID AN ELECTRIC SHOCK

There is a high voltage part inside. Avoid an electric shock while the electric current is flowing.

### 3. USE THE DESIGNATED PARTS

The parts in this equipment have the specific characters of incombustibility and withstand voltage for safety. Therefore, the part which is replaced should be used the part which has the same character.
Especially as to the important parts for safety which is indicated in the circuit diagram or the table of parts as a ⚠ mark, the designated parts must be used.

### 4. PUT PARTS AND WIRES IN THE ORIGINAL POSITION AFTER ASSEMBLING OR WIRING

There are parts which use the insulation material such as a tube or tape for safety, or which are assembled in the condition that these do not contact with the printed board. The inside wiring is designed not to get closer to the pyrogenic parts and high voltage parts. Therefore, put these parts in the original positions.

### 5. TAKE CARE TO DEAL WITH THE CATHODE-RAY TUBE

In the condition that an explosion-proof cathode-ray tube is set in this equipment, safety is secured against implosion. However, when removing it or serving from backward, it is dangerous to give a shock. Take enough care to deal with it.

### 6. AVOID AN X-RAY

Safety is secured against an X-ray by considering about the cathode-ray tube and the high voltage peripheral circuit, etc.
Therefore, when repairing the high voltage peripheral circuit, use the designated parts and make sure not modify the circuit.
Repairing except indicates causes rising of high voltage, and it emits an X-ray from the cathode-ray tube.

### 7. PERFORM A SAFETY CHECK AFTER SERVICING

Confirm that the screws, parts and wiring which were removed in order to service are put in the original positions, or whether there are the portions which are deteriorated around the serviced places serviced or not. Check the insulation between the antenna terminal or external metal and the AC cord plug blades. And be sure the safety of that.

**(INSULATION CHECK PROCEDURE)**

1. Unplug the plug from the AC outlet.
2. Remove the antenna terminal on TV and turn on the TV.
3. Insulation resistance between the cord plug terminals and the eternal exposure metal **[Note 2]** should be more than 1M ohm by using the 500V insulation resistance meter **[Note 1]**.
4. If the insulation resistance is less than 1M ohm, the inspection repair should be required.

**[Note 1]**

If you have not the 500V insulation resistance meter, use a Tester.

**[Note 2]**

External exposure metal: Antenna terminal
Earphone jack

# HOW TO ORDER PARTS

Please include the following informations when you order parts. (Particularly the VERSION LETTER.)

1. MODEL NUMBER and VERSION LETTER
   The MODEL NUMBER can be found on the back of each product and the VERSION LETTER can be found at the end of the SERIAL NUMBER.
2. PART NO. and DESCRIPTION
   You can find it in your SERVICE MANUAL.

# IMPORTANT

Inferior silicon grease can damage IC's and transistors.
When replacing an IC's or transistors, use only specified silicon grease (YG6260M).
Remove all old silicon before applying new silicon.

# CONTENTS

# GENERAL SPECIFICATIONS

| | | | | |
|---|---|---|---|---|
| **G-1** | **TV System** | CRT | CRT Size / Visual Size | 19 inch / 480.0mmV |
| | | | CRT Type | Normal |
| | | | Deflection | 90 degree |
| | | | Magnetic Field BV/BH | +0.45G/0.18G |
| | | Color System | | NTSC |
| | | Speaker | | 1Speaker |
| | | | Position | Bottom |
| | | | Size | 3 Inch |
| | | | Impedance | 8 ohm |
| | | Sound Output | MAX | 1.5 W |
| | | | 10%(Typical) | 1.0 W |
| | | NTSC3.58+4.43 /PAL60Hz | | No |
| **G-2** | **Tuning System** | Broadcasting System | | US System M |
| | | Tuner and Receive CH | System | 1Tuner |
| | | | Destination | USA(W/ CATV) |
| | | | Tuning System | F-Synth |
| | | | Input Impedance | VHF/UHF 75 ohm |
| | | | CH Coverage | 2 - 69, 4A, A-5 - A-1, A - I, J - W, W+1 - W+84 |
| | | Intermediate Frequency | Picture(FP) | 45.75MHz |
| | | | Sound(FS) | 41.25MHz |
| | | | FP-FS | 4.50MHz |
| | | Preset CH | | No |
| | | Stereo/Dual TV Sound | | No |
| | | Tuner Sound Muting | | Yes |
| **G-3** | **Power** | Power Source | AC | 120V AC 60Hz |
| | | | DC | |
| | | Power Consumption | at AC | |
| | | | | 73 W at AC 120 V 60 Hz |
| | | | Stand by (at AC) | 5 W at AC 120 V 60 Hz |
| | | | Per Year | -- kWh/Year |
| | | Protector | Power Fuse | Yes |
| **G-4** | **Regulation** | | Safety | UL / CSA |
| | | | Radiation | FCC / IC |
| | | | X-Radiation | DHHS / HWC |
| **G-5** | **Temperature** | | Operation | +5oC ~ +40oC |
| | | | Storage | -20oC ~ +60oC |
| **G-6** | **Operating Humidity** | | | Less than 80% RH |

# GENERAL SPECIFICATIONS

| | | | | | |
|---|---|---|---|---|---|
| **G-7** | **On Screen Display** | Menu | | | Yes |
| | | | Menu Type | | Character |
| | | | Picture | | Yes |
| | | | | Contrast | Yes |
| | | | | Brightness | Yes |
| | | | | Color | Yes |
| | | | | Tint | Yes |
| | | | | Sharpness | Yes |
| | | | Audio | | No |
| | | | | Bass | No |
| | | | | Treble | No |
| | | | | Balance | No |
| | | | | BBE On/Off | No |
| | | | | Stable Sound On/Off | No |
| | | | CH Set Up | | Yes |
| | | | | TV/CABLE(CATV) | Yes |
| | | | | Auto CH Memory | Yes |
| | | | | Add/ Delete | Yes |
| | | | Language | | Yes |
| | | | V-chip | | Yes |
| | | | Lock | | Yes |
| | | | On Timer | | Yes |
| | | | | CH Label | No |
| | | | | Favorite CH | No |
| | | | | Color Stream DVD/DTV | No |
| | | | Control Level | | Yes |
| | | | | Volume | Yes |
| | | | | Brightness | Yes |
| | | | | Contrast | Yes |
| | | | | Color | Yes |
| | | | | Tint | Yes |
| | | | | Sharpness | Yes |
| | | | | Tuning | No |
| | | | | Bass | No |
| | | | | Treble | No |
| | | | | Balance | No |
| | | | | Back Light | No |
| | | | Stereo,Audio Output,SAP | | No |
| | | | Video | | Yes |
| | | | Color Stream | | No |
| | | | Channel(TV/Cable) | | Yes |
| | | | CH Label | | No |
| | | | Game Timer | | Yes |
| | | | Sleep Timer | | Yes |
| | | | Sound Mute | | Yes |
| | | | V-chip Rating | | Yes |
| **G-8** | **OSD Language** | | | | English French Spanish |
| **G-9** | **Clock and Timer** | Sleep Timer | Max Time | | 120 Min |
| | | | Step | | 10 Min |
| | | On Timer | Program(On Timer ) | | Yes |
| | | Wake Up Timer | | | No |
| | | Timer Back-up (at Power Off Mode) | more than | | -- Min Sec |

# GENERAL SPECIFICATIONS

| | | | | |
|---|---|---|---|---|
| **G-10** | **Remote Control** | Unit | | RC-EH |
| | | Glow in Dark Remocon | | Yes |
| | | Format | | Toshiba |
| | | Custom Code | | 40-BF h |
| | | Power Source | Voltage(D.C) | 3V |
| | | | UM size x pcs | UM-4 x 2 pcs |
| | | Total Keys | | 27 Keys |
| | | Keys | Power | Yes |
| | | | 1 | Yes |
| | | | 2 | Yes |
| | | | 3 | Yes |
| | | | 4 | Yes |
| | | | 5 | Yes |
| | | | 6 | Yes |
| | | | 7 | Yes |
| | | | 8 | Yes |
| | | | 9 | Yes |
| | | | 0 | Yes |
| | | | 100 | No |
| | | | CH Up | Yes |
| | | | CH Down | Yes |
| | | | Volume Up | Yes |
| | | | Volume Down | Yes |
| | | | TV/Caption/Text | Yes |
| | | | CH1/CH2 | Yes |
| | | | TV/Video(TV/AV) | Yes |
| | | | CH RTN/CH ENT(Quick View) | Yes |
| | | | Sleep | Yes |
| | | | RE Call(Call) | Yes |
| | | | Reset | Yes |
| | | | Menu | Yes |
| | | | Enter | Yes |
| | | | Mute | Yes |
| | | | Exit | No |
| | | | MTS(Audio Select) | No |
| | | | Set + | Yes |
| | | | Set - | Yes |
| | | Multi Brand Keys | CH Up(VCR) | No |
| | | | CH Down(VCR) | No |
| | | | Pause/Still | No |
| | | | TV/VCR(VCR) | No |
| | | | Code | No |
| | | | FF | No |
| | | | Rew | No |
| | | | Rec | No |
| | | | Play | No |
| | | | Stop | No |
| | | | TV | No |
| | | | VCR | No |
| | | | Cable | No |

# GENERAL SPECIFICATIONS

| | | | | |
|---|---|---|---|---|
| **G-11** | **Features** | Auto Degauss | | Yes |
| | | Auto Shut Off | | Yes |
| | | Canal+ | | No |
| | | CATV | | Yes |
| | | Anti-theft | | No |
| | | Rental | | No |
| | | Memory(Last CH) | | Yes |
| | | Memory(Last Volume) | | Yes |
| | | V-Chip | | Yes |
| | | | Type | USA,ORION Type |
| | | BBE | | No |
| | | Auto Search | | No |
| | | CH Allocation | | No |
| | | SAP | | No |
| | | Just Clock Function | | No |
| | | CH Label | | No |
| | | VM Circuit | | No |
| | | Full OSD | | No |
| | | Premiere | | No |
| | | Comb Filter | | No |
| | | | | Lines |
| | | Auto CH Memory | | Yes |
| | | Hotel Lock | | No |
| | | Closed Caption | | Yes |
| | | Stable Sound | | No |
| | | FBT Leak Test Protect | | Yes |
| | | CH Lock | | Yes |
| | | Video Lock | | Yes |
| | | Game Timer (Max Time:120 Min) | | Yes |
| | | Stable Sound | | No |
| | | Energy Star | | No |
| | | Power On Memory | | Yes |
| | | Favorite CH | | No |
| **G-12** | **Accessories** | Owner's Manual | Language | English / Spanish / French |
| | | | W/ Warranty | Yes |
| | | Remote Control Unit | | Yes |
| | | Rod Antenna | | No |
| | | | Poles | |
| | | | Terminal | |
| | | Loop Antenna | | No |
| | | | Terminal | |
| | | U/V Mixer | | No |
| | | DC Car Cord (Center+) | | No |
| | | Guarantee Card | | No |
| | | Warning Sheet | | No |
| | | Circuit Diagram | | No |
| | | Antenna Change Plug | | No |
| | | Service Facility List | | No |
| | | Important Safety Instruction | | No |
| | | Dew/AHC Caution Sheet | | No |
| | | AC Plug Adapter | | No |
| | | Quick Set-up Sheet | | No |
| | | Battery | | Yes |
| | | | UM size x pcs | UM4 x 2 |
| | | | OEM Brand | No |
| | | AC Cord | | No |
| | | AV Cord (2Pin-1Pin) | | No |
| | | Registration Card (NDL Card) | | Yes |
| | | ESP Card | | No[From '04 MAR O/R] |
| | | PTB Sheet | | No |
| | | 300 ohm to 75 ohm Antenna Adapter | | No |

# GENERAL SPECIFICATIONS

| | | | | | |
|---|---|---|---|---|---|
| **G-13** | **Interface** | Switch | Front | Power | Yes |
| | | | | System Select | No |
| | | | | Main Power SW | No |
| | | | | Sub Power | No |
| | | | | Channel Up/Reset | Yes |
| | | | | Channel Down/Enter | Yes |
| | | | | Volume Up/Set Up | Yes |
| | | | | Volume Down/Set Down | Yes |
| | | | | MENU=Volume Up+Volume Down | Yes |
| | | | Rear | AC/DC | No |
| | | | | TV/CATV Selector | No |
| | | | | Degauss | No |
| | | | | Main Power SW | No |
| | | Indicator | | Power | Yes |
| | | | | Stand-by | No |
| | | | | On Timer | No |
| | | Terminals | Front | Video Input | RCA |
| | | | | Audio Input | RCA x 1 |
| | | | | Other Terminal | No |
| | | | Rear | Video Input(Rear1) | No |
| | | | | Video Input(Rear2) | No |
| | | | | Audio Input(Rear1) | No |
| | | | | Audio Input(Rear2) | No |
| | | | | Video Output | No |
| | | | | Audio Output | No |
| | | | | Euro Scart | No |
| | | | | Color Stream | No |
| | | | | Diversity | No |
| | | | | Ext Speaker | No |
| | | | | DC Jack 12V(Center +) | No |
| | | | | VHF/UHF Antenna Input | F Type |
| | | | | AC Outlet | No |
| **G-14** | **Set Size** | | | Approx. W x D x H (mm) | 488 x 465 x 416 |
| **G-15** | **Weight** | | | Net (Approx.) | 17.5kg ( 38.6 lbs) |
| | | | | Gross (Approx.) | 20.0kg ( 44.1lbs) |
| **G-16** | **Carton** | | Master Carton | | No |
| | | | | Content | ---- Sets |
| | | | | Material | -- /-- |
| | | | | Dimensions W x D x H(mm) | -- x -- x -- |
| | | | | Description of Origin | No |
| | | | Gift Box | | Yes |
| | | | | Material | Double/Brown |
| | | | | Dimensions W x D x H(mm) | 546 x 526 x 472 |
| | | | | Design | As per Buyer's |
| | | | | Description of Origin | Yes |
| | | | Drop Test | | Natural Dropping At 1 Corner / 2 Edges / 4 Surfaces |
| | | | | Height (cm) | 60 (ORION SPEC:46) |
| | | | Container Stuffing | | 436 Sets/40' container |
| **G-17** | **Cabinet Material** | | Cabinet | Cabinet Front | PS 94V0 DECABROM |
| | | | | Cabinet Rear | PS 94V0 DECABROM |
| | | | PCB | Non-Halogen Demand | No |
| | | | | Eyelet Demand | Yes |
| **G-18** | **Environment** | | Pb Free | Lead-free Solder | No |
| | | | Cd Free | | No |

# DISASSEMBLY INSTRUCTIONS

## 1. REMOVAL OF ANODE CAP

Read the following **NOTED** items before starting work.

* After turning the power off there might still be a potential voltage that is very dangerous. When removing the Anode Cap, make sure to discharge the Anode Cap's potential voltage.
* Do not use pliers to loosen or tighten the Anode Cap terminal, this may cause the spring to be damaged.

**REMOVAL**

1. Follow the steps as follows to discharge the Anode Cap. **(Refer to Fig. 1-1.)**
   Connect one end of an Alligator Clip to the metal part of a flat-blade screwdriver and the other end to ground.
   While holding the plastic part of the insulated Screwdriver, touch the support of the Anode with the tip of the Screwdriver.
   A cracking noise will be heard as the voltage is discharged.

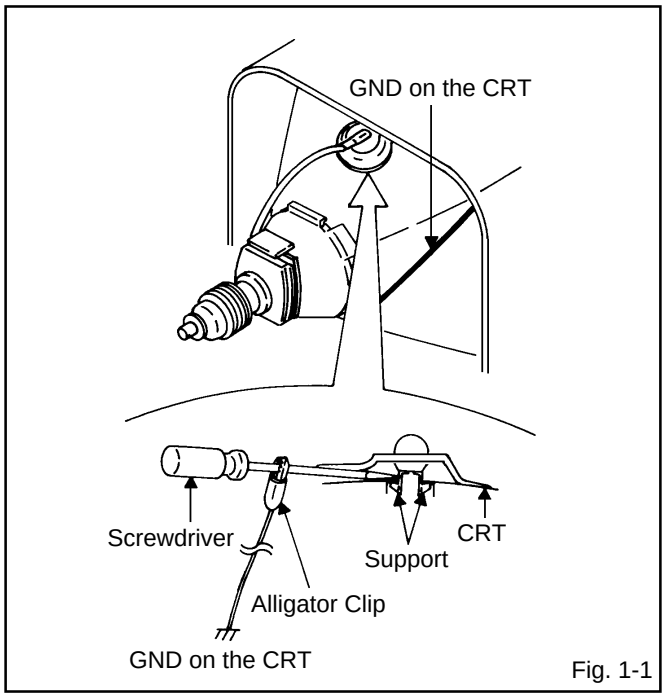


Fig. 1-1

2. Flip up the sides of the Rubber Cap in the direction of the arrow and remove one side of the support. **(Refer to Fig. 1-2.)**

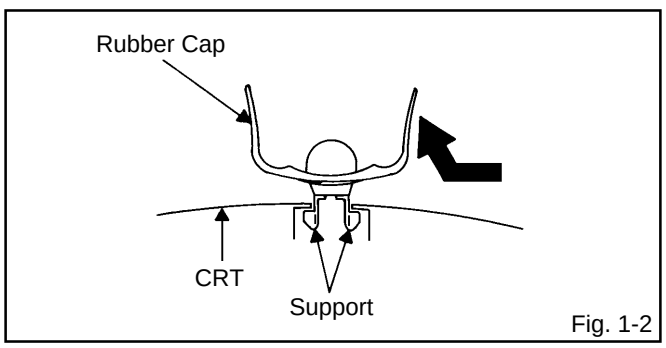


Fig. 1-2

3. After one side is removed, pull in the opposite direction to remove the other.

**NOTE**

Take care not to damage the Rubber Cap.

**INSTALLATION**

1. Clean the spot where the cap was located with a small amount of alcohol. **(Refer to Fig. 1-3.)**

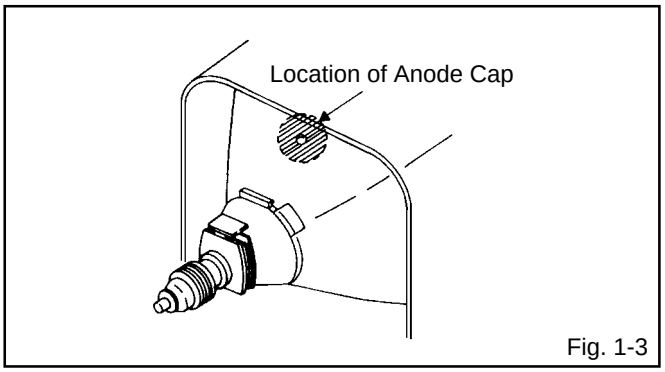


Fig. 1-3

**NOTE**

Confirm that there is no dirt, dust, etc. at the spot where the cap was located.

2. Arrange the wire of the Anode Cap and make sure the wire is not twisted.
3. Turn over the Rubber Cap. **(Refer to Fig. 1-4.)**

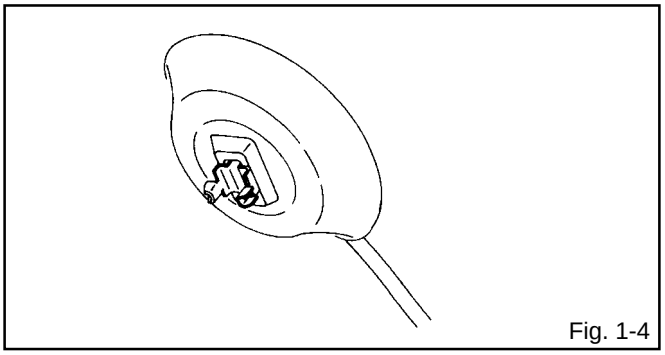


Fig. 1-4

4. Insert one end of the Anode Support into the anode button, then the other as shown in **Fig. 1-5**.

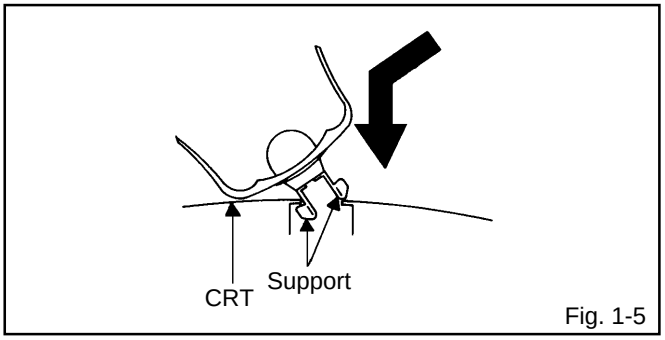


Fig. 1-5

5. Confirm that the Support is securely connected.
6. Put on the Rubber Cap without moving any parts.

# DISASSEMBLY INSTRUCTIONS

## 2. REMOVAL AND INSTALLATION OF FLAT PACKAGE IC

**REMOVAL**

1. Put the Masking Tape (cotton tape) around the Flat Package IC to protect other parts from any damage. **(Refer to Fig. 2-1.)**

   **NOTE**

   Masking is carried out on all the parts located within 10 mm distance from IC leads.

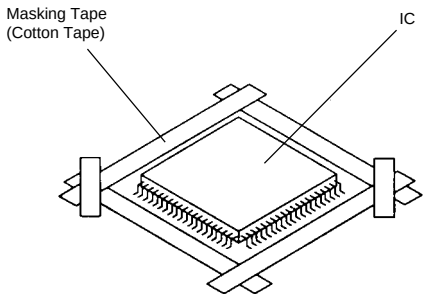



Fig. 2-1

2. Heat the IC leads using a blower type IC desoldering machine. **(Refer to Fig. 2-2.)**

   **NOTE**

   Do not add the rotating and the back and forth directions force on the IC, until IC can move back and forth easily after desoldering the IC leads completely.

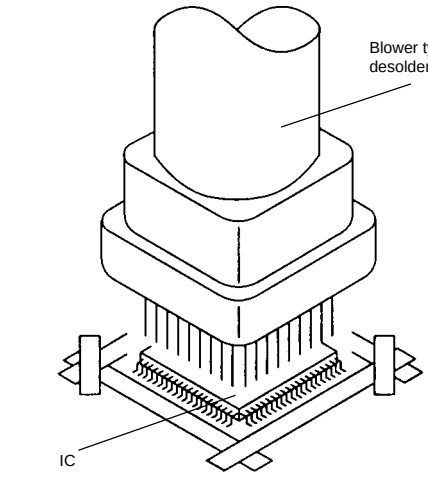



Fig. 2-2

3. When IC starts moving back and forth easily after desoldering completely, pickup the corner of the IC using a tweezers and remove the IC by moving with the IC desoldering machine. **(Refer to Fig. 2-3.)**

   **NOTE**

   Some ICs on the PCB are affixed with glue, so be careful not to break or damage the foil of each IC leads or solder lands under the IC when removing it.

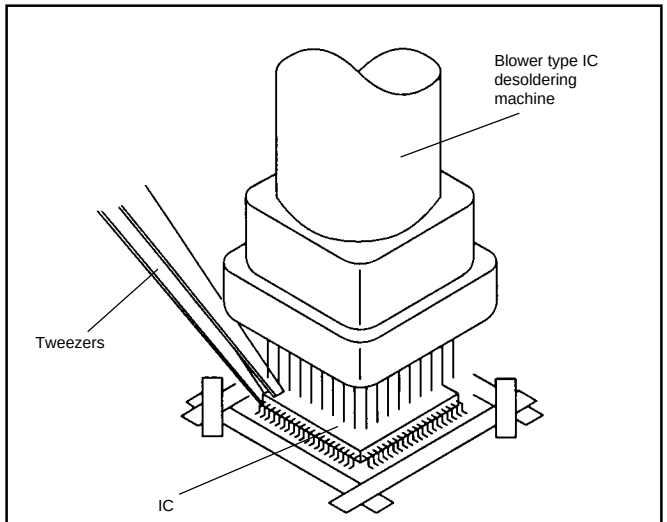



Fig. 2-3

4. Peel off the Masking Tape.

5. Absorb the solder left on the pattern using the Braided Shield Wire. **(Refer to Fig. 2-4.)**

   **NOTE**

   Do not move the Braided Shield Wire in the vertical direction towards the IC pattern.

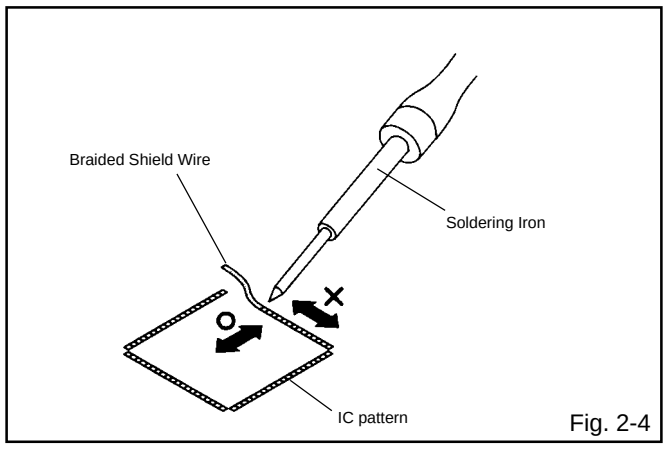



Fig. 2-4

# DISASSEMBLY INSTRUCTIONS

**INSTALLATION**

1. Take care of the polarity of new IC and then install the new IC fitting on the printed circuit pattern. Then solder each lead on the diagonal positions of IC temporarily. **(Refer to Fig. 2-5.)**

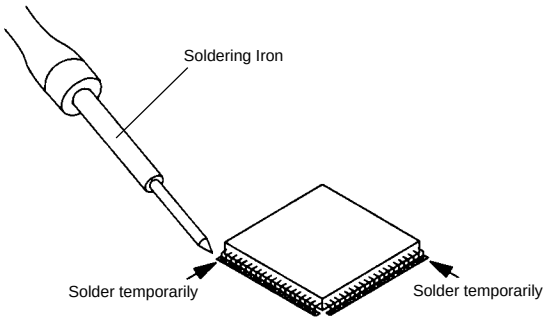



Fig. 2-5

2. Supply the solder from the upper position of IC leads sliding to the lower position of the IC leads. **(Refer to Fig. 2-6.)**

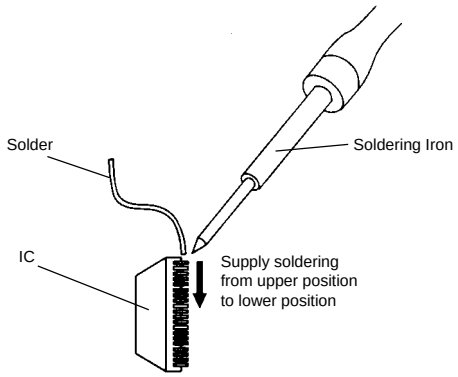



Fig. 2-6

3. Absorb the solder left on the lead using the Braided Shield Wire. **(Refer to Fig. 2-7.)**

   **NOTE**

   Do not absorb the solder to excess.

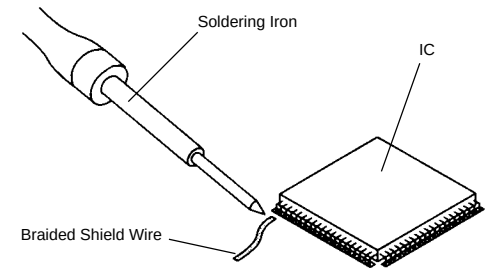



Fig. 2-7

4. When bridge-soldering between terminals and/or the soldering amount are not enough, resolder using a Thin-tip Soldering Iron. **(Refer to Fig. 2-8.)**

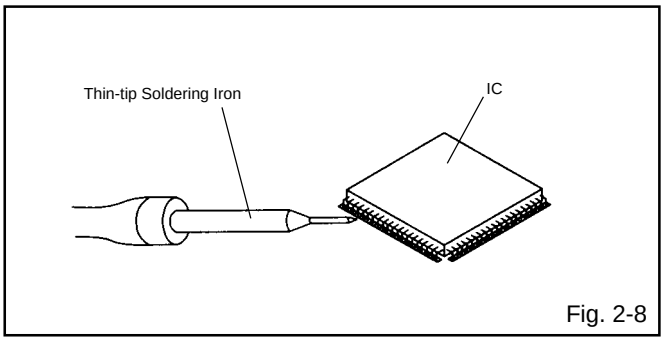



Fig. 2-8

5. Finally, confirm the soldering status on four sides of the IC using a magnifying glass.
   Confirm that no abnormality is found on the soldering position and installation position of the parts around the IC. If some abnormality is found, correct by resoldering.

   **NOTE**

   When the IC leads are bent during soldering and/or repairing, do not repair the bending of leads. If the bending of leads are repaired, the pattern may be damaged. So, always be sure to replace the IC in this case.

# SERVICE MODE LIST

This unit provided with the following SERVICE MODES so you can repair, examine and adjust easily.
To enter the Service Mode, press both set key and remote control key for more than 1 second.

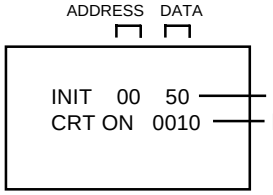
| Set Key | Remocon Key | Operations |
|---|---|---|
| VOL. (-) MIN | 0 | Releasing of V-CHIP PASSWORD. |
| VOL. (-) MIN | 1 | Initialization of the factory.<br>NOTE: Do not use this for the normal servicing.<br>If you set a factory initialization, the memories are reset such as the channel setting, and the POWER ON total hours. |
| VOL. (-) MIN | 6 | POWER ON total hours is displayed on the screen.<br>Refer to the "CONFIRMATION OF HOURS USED".<br><br>Can be checked of the INITIAL DATA of MEMORY IC.<br>Refer to the "WHEN REPLACING EEPROM (MEMORY) IC". |
| VOL. (-) MIN | 8 | Writing of EEPROM initial data.<br>NOTE: Do not use this for the normal servicing. |
| VOL. (-) MIN | 9 | Display of the Adjustment MENU on the screen.<br>Refer to the "ELECTRICAL ADJUSTMENT" (On-Screen Display Adjustment). |

# CONFIRMATION OF HOURS USED

POWER ON total hours can be checked on the screen. Total hours are displayed in 16 system of notation.

**NOTE: If you set a factory initialization, the total hours is reset to "0".**

1. Set the VOLUME to minimum.
2. Press both VOL. DOWN button on the set and Channel button **(6)** on the remote control for more than 1 second.
3. After the confirmation of using hours, turn off the power.




Initial setting content of MEMORY IC.
POWER ON total hours.
= (16 x 16 x 16 x thousands digit value)
+ (16 x 16 x hundreds digit value)
+ (16 x tens digit value)
+ (ones digit value)

**FIG. 1**

# WHEN REPLACING EEPROM (MEMORY) IC

If a service repair is undertaken where it has been required to change the MEMORY IC, the following steps should be taken to ensure correct data settings while making reference to TABLE 1.

**NOTE: No need setting for after INI 0F due to the adjustment value.**

| INI | +0 | +1 | +2 | +3 | +4 | +5 | +6 | +7 | +8 | +9 | +A | +B | +C | +D | +E | +F |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 50 | 04 | EB | 4E | 57 | B3 | 24 | 69 | 39 | 00 | 00 | 05 | 90 | AE | 00 | 07 |

**Table 1**

1. Enter DATA SET mode by setting VOLUME to minimum.
2. Press both VOL. DOWN button on the set and Channel button **(6)** on the remote control for more than 1 second. ADDRESS and DATA should appear as FIG 1.
3. ADDRESS is now selected and should "blink". Using the VOL. +/- button on the remote, step through the ADDRESS until required ADDRESS to be changed is reached.
4. Press ENTER to select DATA. When DATA is selected, it will "blink".
5. Again, step through the DATA using VOL. +/- button until required DATA value has been selected.
6. Pressing ENTER will take you back to ADDRESS for further selection if necessary.
7. Repeat steps 3 to 6 until all data has been checked.
8. When satisfied correct DATA has been entered, turn POWER off (return to STANDBY MODE) to finish DATA input. **After the data input, set to the initializing of shipping.**
9. Turn POWER on.
10. Press both VOL. DOWN button on the set and Channel button **(1)** on the remote control for more than 1 second.
11. After the finishing of the initializing of shipping, the unit will turn off automatically.

The unit will now have the correct DATA for the new MEMORY IC.

# ELECTRICAL ADJUSTMENTS

## 1. ADJUSTMENT PROCEDURE

Read and perform these adjustments when repairing the circuits or replacing electrical parts or PCB assemblies.

**CAUTION**

- Use an isolation transformer when performing any service on this chassis.
- Before removing the anode cap, discharge electricity because it contains high voltage.
- When removing a PCB or related component, after unfastening or changing a wire, be sure to put the wire back in its original position.
- When you exchange IC and Transistor for a heat sink, apply the silicon grease on the contact section of the heat sink. Before applying new silicon grease, remove all the old silicon grease. (Old grease may cause damages to the IC and Transistor.)

**Prepare the following measurement tools for electrical adjustments.**

1. Oscilloscope
2. Digital Voltmeter
3. Pattern Generator

**On-Screen Display Adjustment**

1. In the condition of NO indication on the screen. Press the VOL. DOWN button on the set and the Channel button **(9)** on the remote control for more than 1 second to appear the adjustment mode on the screen as shown in **Fig. 1-1**.

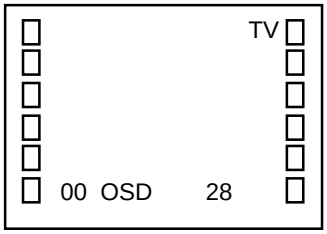



Fig. 1-1

3. Use the Channel UP/DOWN button or Channel button **(0-9)** on the remote control to select the options shown in **Fig. 1-2**.
4. Press the MENU button on the remote control to end the adjustments.

| NO. | FUNCTION | NO. | FUNCTION |
|---|---|---|---|
| 00 | OSD H | 16 | CONTRAST CENT |
| 01 | CUT OFF | 17 | CONTRAST MAX |
| 04 | H. VCO | 18 | CONTRAST MIN |
| 05 | H. PHASE | 19 | COLOR CENTER |
| 06 | V. SIZE | 20 | COLOR MAX |
| 07 | V. SHIFT | 21 | COLOR MIN |
| 08 | R DRIVE | 22 | TINT |
| 09 | B DRIVE | 23 | SHARPNESS |
| 10 | R BIAS | 24 | FM LEVEL |
| 11 | G BIAS | 25 | LEVEL |
| 12 | B BIAS | 26 | SEPARATION1 |
| 13 | BRIGHT CENT | 27 | SEPARATION2 |
| 14 | BRIGHT MAX | 28 | TEST MONO |
| 15 | BRIGHT MIN | 29 | TEST STEREO |

Fig. 1-2

## 2. BASIC ADJUSTMENTS

**2-1: CUT OFF**

1. Adjust the unit to the following settings. R.DRIVE=10, B.DRIVE=10, R.BIAS=64, G.BIAS=64, B.BIAS=64, BRI.CENT=100, CONT.MAX=60.
2. Place the set with Aging Test for more than 15 minutes.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(01)** on the remote control to select "CUT OFF".
4. Adjust the **Screen Volume** until a dim raster is obtained.

**2-2: WHITE BALANCE**

**NOTE:** Adjust after performing CUT OFF adjustment.

1. Place the set with Aging Test for more than 10 minutes.
2. Receive the gray scale pattern from the Pattern Generator.
3. Using the remote control, set the brightness and contrast to normal position.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(10)** on the remote control to select “R. BIAS”.
5. Press the CH. UP/DOWN button on the remote control to select the “R. BIAS”, “G. BIAS”, “B. BIAS”, “R. DRIVE” or “B. DRIVE”.
6. Adjust the VOL. UP/DOWN button on the remote control to whiten the R. BIAS, G. BIAS, B. BIAS, R. DRIVE, and B. DRIVE at each step tone sections equally.
7. Perform the above adjustments 5 and 6 until the white color is looked like a white.

**2-3: FOCUS**

1. Receive the monoscope pattern.
2. Turn the Focus Volume fully counterclockwise once.
3. Adjust the **Focus Volume** until picture is distinct.

**2-4: HORIZONTAL PHASE**

1. Receive the monoscope pattern.
2. Using the remote control, set the brightness and contrast to normal position.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(05)** on the remote control to select “H. PHAS”.
4. Press the VOL. UP/DOWN button on the remote control until the SHIFT quantity of the OVER SCAN on right and left becomes minimum.

**2-5: VERTICAL SHIFT**

1. Receive the monoscope pattern.
2. Using the remote control, set the brightness and contrast to normal position.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(07)** on the remote control to select “V. SFT”.
4. Press the VOL. UP/DOWN button on the remote control until the horizontal line becomes fit to the notch of the shadow mask.

# ELECTRICAL ADJUSTMENTS

### 2-6: VERTICAL SIZE

1. Receive the monoscope pattern.
2. Using the remote control, set the brightness and contrast to normal position.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(06)** on the remote control to select “V. SIZE”.
4. Press the VOL. UP/DOWN button on the remote control until the SHIFT quantity of the OVER SCAN on upside and downside becomes 10 ± 2%.

### 2-7: SUB BRIGHTNESS

1. Receive the monoscope pattern. (RF Input)
2. Using the remote control, set the brightness and contrast to normal position.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(13)** on the remote control to select "BRI.CENT".
4. Press the VOL. UP/DOWN button on the remote control until the white 0% is starting to be visible
5. Receive the monoscope pattern. (Audio Video Input)
6. Press the TV/VIDEO button on the remote control to set to the AV mode. Then perform the above adjustments 2~4.

### 2-8: SUB TINT/SUB COLOR

1. Receive the color bar pattern.
2. Connect the oscilloscope to **TP023**.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(22)** on the remote control to select "TINT".
4. Press the VOL. UP/DOWN button on the remote control until the section "A" becomes as straight line **(Refer to Fig. 2-1)**
5. Connect the oscilloscope to **TP022**.
6. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(19)** on the remote control to select "COL.CENT".
7. Press the VOL. UP/DOWN button on the remote control until the red color level is adjusted to 110 ± 10% of the white level. **(Refer to Fig. 2-2)**
8. Receive the color bar pattern. (Audio Video Input)
9. Press the TV/VIDEO button on the remote control to set to the AV mode. Then perform the above adjustments 2~7

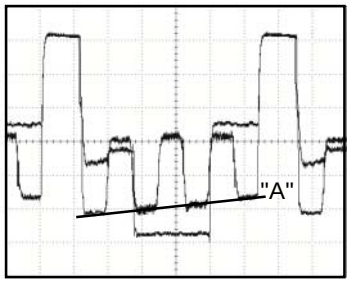



Fig. 2-1

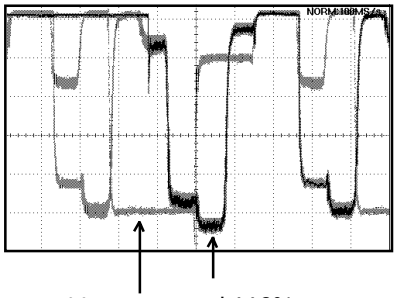



Fig. 2-2

### 2-9: SUB CONTRAST

1. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(17)** on the remote control to select “CONT. MAX”.
2. Press the VOL. UP/DOWN button on the remote control until the contrast step No. becomes “60”.
3. Receive a broadcast and check if the picture is normal.
4. Press the TV/VIDEO button on the remote control to set to the AV mode. Then perform the above adjustments 1~3.

### 2-10: OSD HORIZONTAL

1. Activate the adjustment mode display of **Fig. 1-1**.
2. Press the VOL. UP/DOWN button on the remote control until the difference of A and B becomes minimum. **(Refer to Fig. 2-3)**

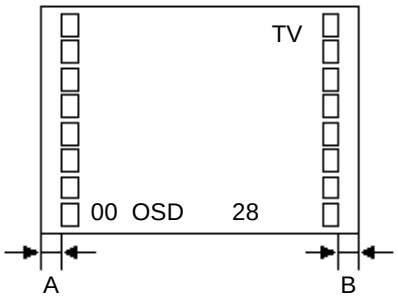



Fig. 2-3

### 2-11: Confirmation of Fixed Value (Step No.)

Please check if the fixed values of the each adjustment items are set correctly referring below. (RF/AV)

| NO. | FUNCTION | STEP NO. |
|---|---|---|
| 04 | H. VCO | 04 |
| 14 | BRIGHT MAX | 183 |
| 15 | BRIGHT MIN | 60 |
| 16 | CONTRAST CENT | 30 |
| 18 | CONTRAST MIN | 17 |
| 20 | COLOR MAX | 74 |
| 21 | COLOR MIN | 00 |
| 23 | SHARPNESS | 45 |
| 24 | FM LEVEL | 00 |
| 25 | LEVEL | 00 |
| 26 | SEPARATION1 | 00 |
| 27 | SEPARATION2 | 00 |

# ELECTRICAL ADJUSTMENTS

## 3. PURITY AND CONVERGENCE ADJUSTMENTS

**NOTE**

1. Turn the unit on and let it warm up for at least 30 minutes before performing the following adjustments.
2. Place the CRT surface facing east or west to reduce the terrestrial magnetism.
3. Turn ON the unit and demagnetize with a Degauss Coil.

### 3-1: STATIC CONVERGENCE (ROUGH ADJUSTMENT)

1. Tighten the screw for the magnet. Refer to the adjusted CRT for the position. **(Refer to Fig. 3-1)**
   If the deflection yoke and magnet are in one body, untighten the screw for the body.
2. Receive the green raster pattern from the color bar generator.
3. Slide the deflection yoke until it touches the funnel side of the CRT.
4. Adjust center of screen to green, with red and blue on the sides, using the pair of purity magnets.
5. Switch the color bar generator from the green raster pattern to the crosshatch pattern.
6. Combine red and blue of the 3 color crosshatch pattern on the center of the screen by adjusting the pair of 4 pole magnets.
7. Combine red/blue (magenta) and green by adjusting the pair of 6 pole magnets.
8. Adjust the crosshatch pattern to change to white by repeating steps 6 and 7.

### 3-2: PURITY

**NOTE**

Adjust after performing adjustments in section 3-1.

1. Receive the green raster pattern from color bar generator.
2. Adjust the pair of purity magnets to center the color on the screen.
   Adjust the pair of purity magnets so the color at the ends are equally wide.
3. Move the deflection yoke backward (to neck side) slowly, and stop it at the position when the whole screen is green.
4. Confirm red and blue color.
5. Adjust the slant of the deflection yoke while watching the screen, then tighten the fixing screw.

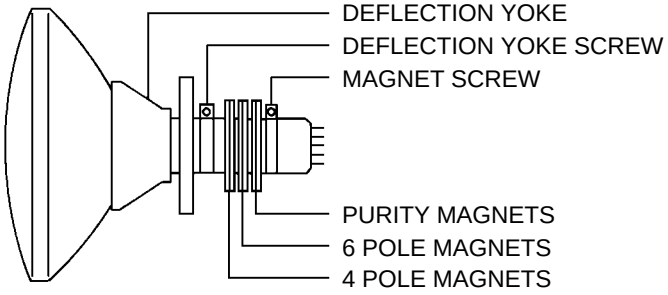



**Fig. 3-1**

### 3-3: STATIC CONVERGENCE

**NOTE**

Adjust after performing adjustments in section 3-2.

1. Receive the crosshatch pattern from the color bar generator.
2. Combine red and blue of the 3 color crosshatch pattern on the center of the screen by adjusting the pair of 4 pole magnets.
3. Combine red/blue (magenta) and green by adjusting the pair of 6 pole magnets.

### 3-4: DYNAMIC CONVERGENCE

**NOTE**

Adjust after performing adjustments in section 3-3.

1. Adjust the differences around the screen by moving the deflection yoke upward/downward and right/left. **(Refer to Fig. 3-2-a)**
2. Insert three wedges between the deflection yoke and CRT funnel to fix the deflection yoke. **(Refer to Fig. 3-2-b)**

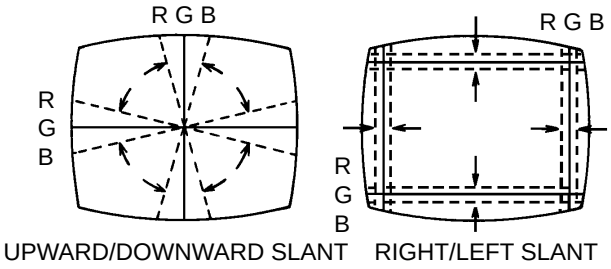
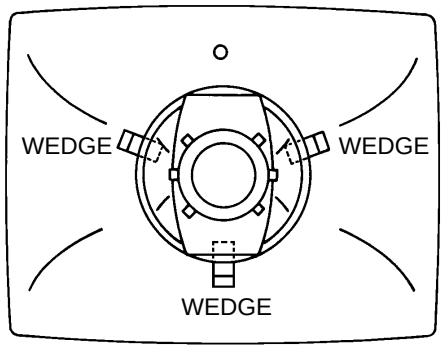



**Fig. 3-2-a**

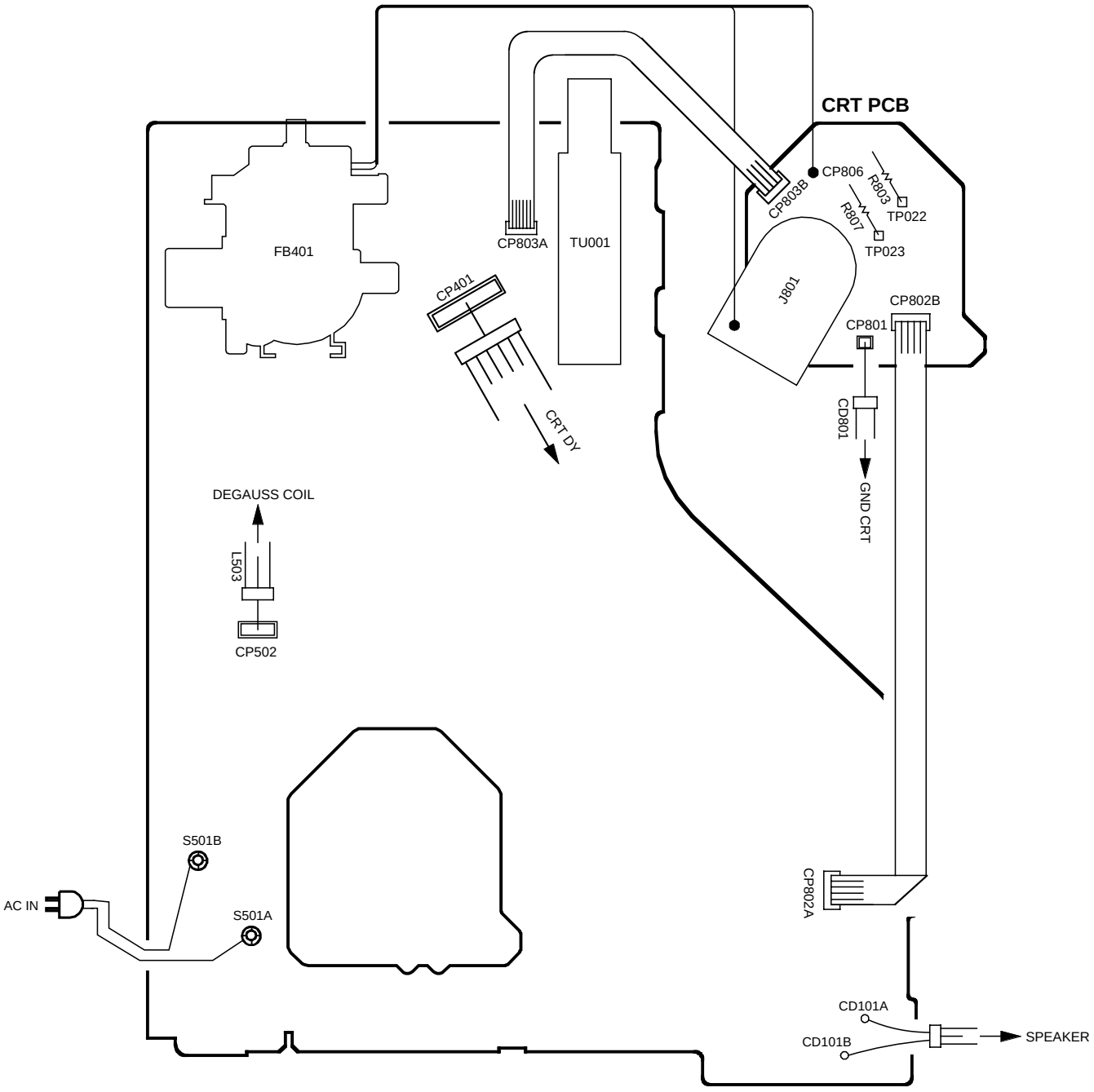



WEDGE POSITION

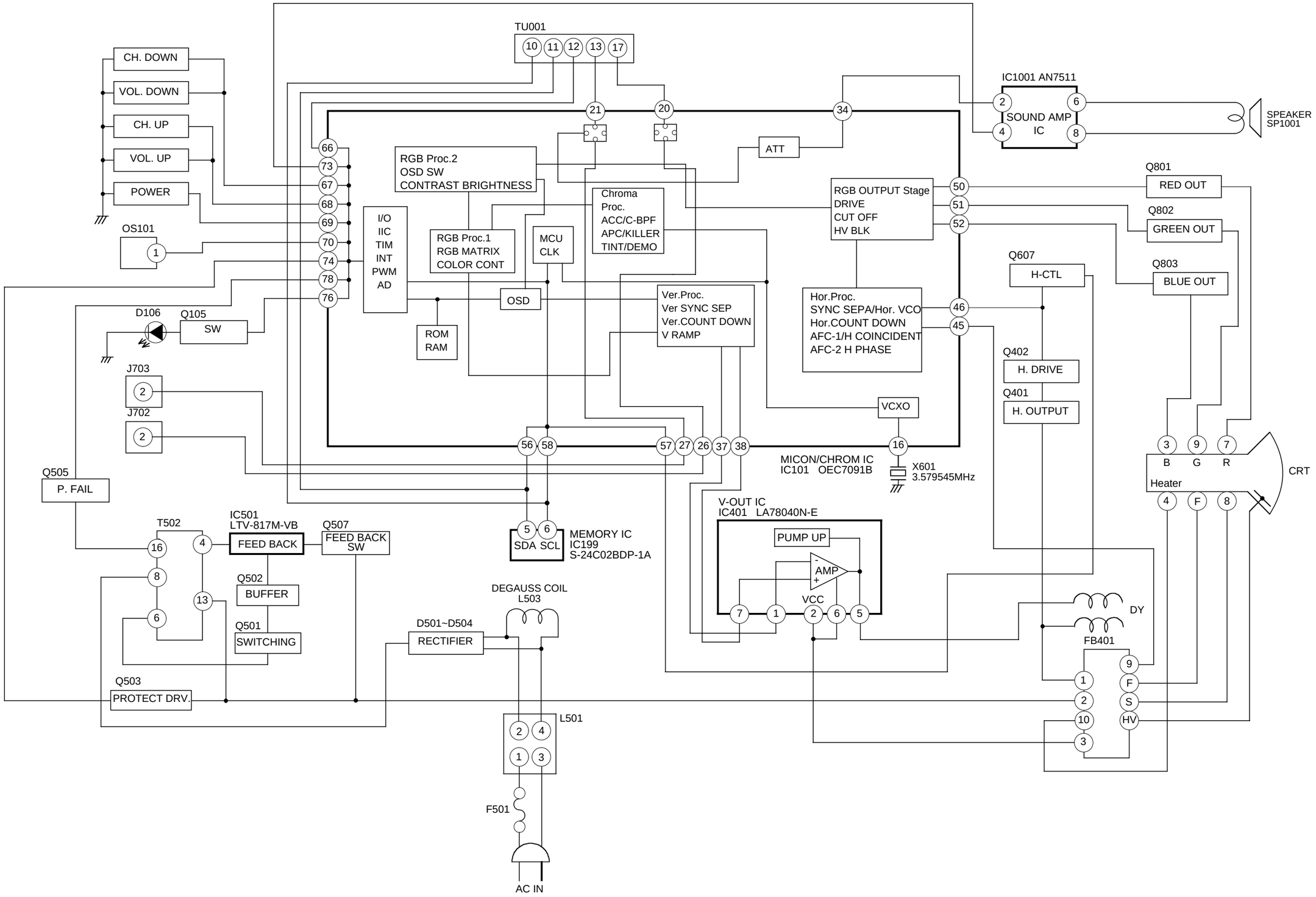
**Fig. 3-2-b**

# ELECTRICAL ADJUSTMENTS

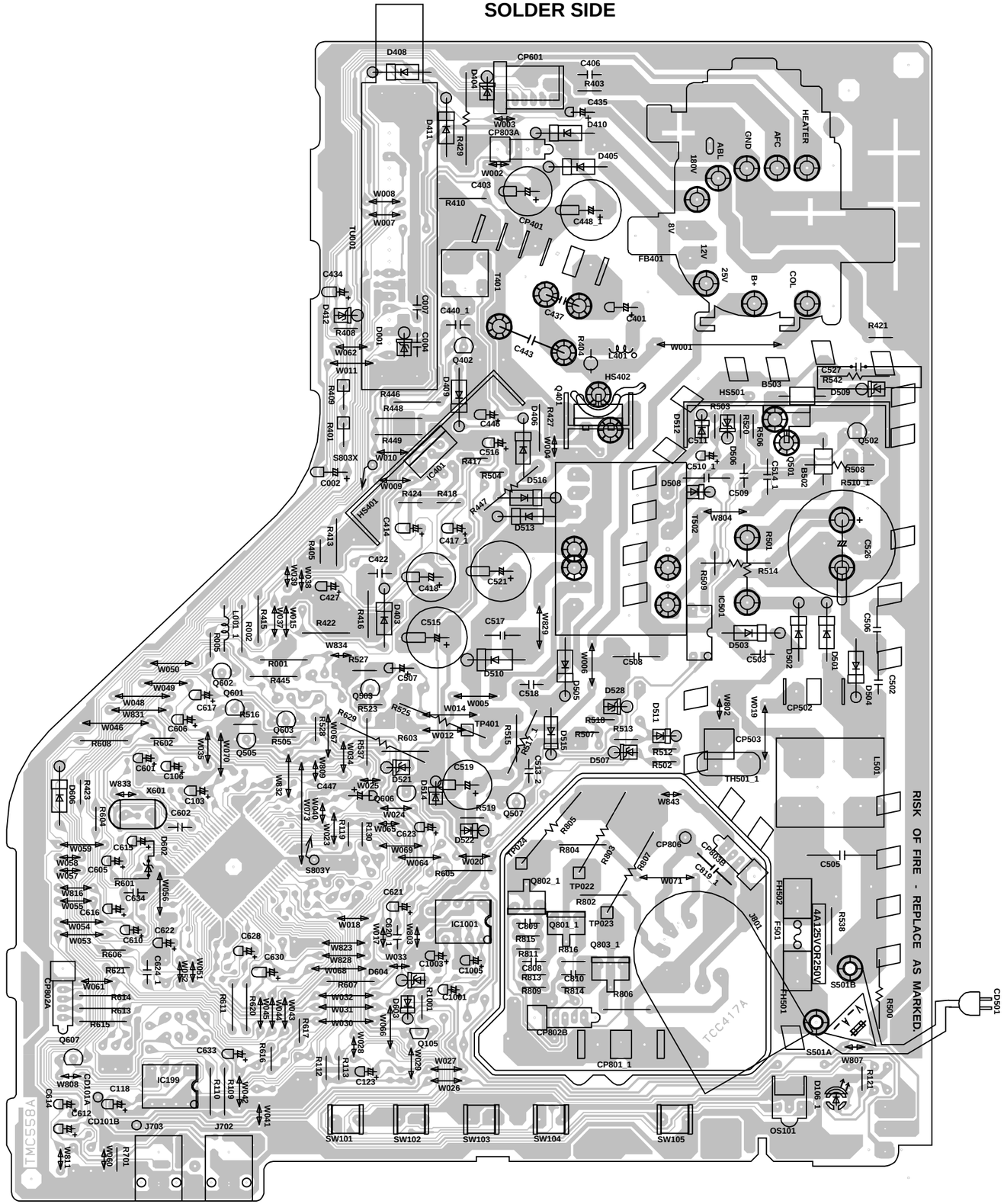
## 4. ELECTRICAL ADJUSTMENT PARTS LOCATION GUIDE (WIRING CONNECTION)



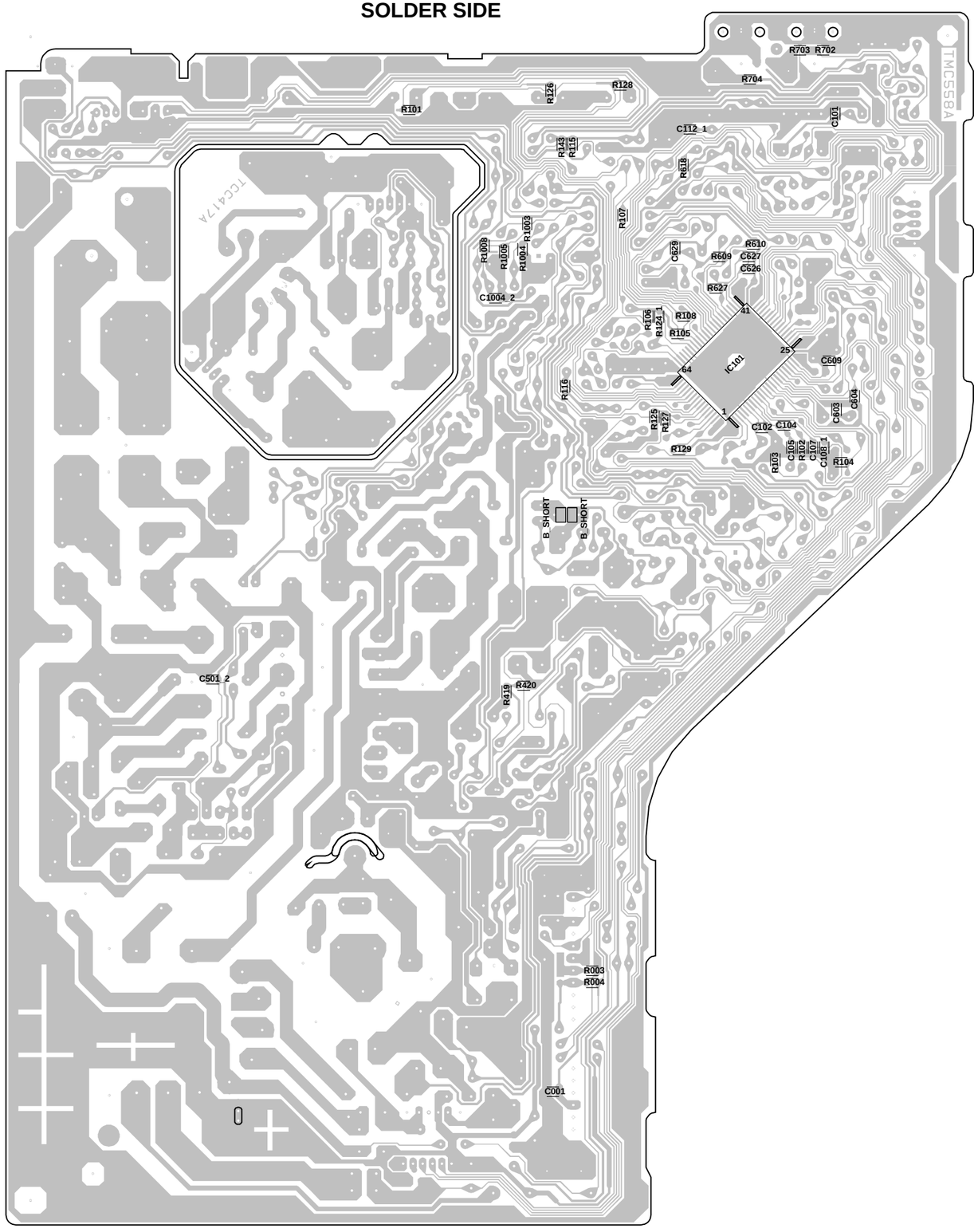
# BLOCK DIAGRAM



# PRINTED CIRCUIT BOARDS
# MAIN/CRT (INSERTED PARTS)
## SOLDER SIDE



# PRINTED CIRCUIT BOARDS
# MAIN (CHIP MOUNTED PARTS)
## SOLDER SIDE



# MICON/CHROMA/TUNER SCHEMATIC DIAGRAM
## (MAIN PCB)

| | | | |
|---|---|---|---|
| 1 | CNVSS | 41 | NC |
| 2 | XIN | 42 | HVCO F/B |
| 3 | XOUT | 43 | AFC FILTER |
| 4 | TEST1 | 44 | DEF GND |
| 5 | VSS | 45 | FBP IN |
| 6 | MCU VCC | 46 | H OUT |
| 7 | TEST0 | 47 | DEF VCC |
| 8 | FILT | 48 | NC |
| 9 | HLT | 49 | HI VCC |
| 10 | VHOLD | 50 | R OUT |
| 11 | CVIN | 51 | G OUT |
| 12 | RESET IN | 52 | B OUT |
| 13 | MCU RESET OUT | 53 | ACL |
| 14 | Y SW OUT | 54 | NC |
| 15 | V/C GND | 55 | PROTECT |
| 16 | 3.58 XTAL | 56 | SDA |
| 17 | C-APC | 57 | H_CTL |
| 18 | MCU5.7V REG OUT | 58 | SCL |
| 19 | NC | 59 | NC |
| 20 | CVBS IN3 | 60 | NC |
| 21 | AUDIO IN3 | 61 | NC |
| 22 | V/C VCC | 62 | DEGAUSS_H |
| 23 | MCU TEST | 63 | STANDBY_H |
| 24 | CVBS IN2 | 64 | VOLUME |
| 25 | AUDIO IN2 | 65 | NC |
| 26 | CVBS IN1 | 66 | AFT |
| 27 | AUDIO IN1 | 67 | KEY1 |
| 28 | 5.7V REG OUT | 68 | KEY2 |
| 29 | C(Y/C) IN | 69 | POWER_ON |
| 30 | Y(Y/C) IN | 70 | REMOCON |
| 31 | VREG VCC | 71 | AV2 |
| 32 | FSC OUT | 72 | AV1 |
| 33 | MONITOR OUT | 73 | AUDIO_MUTE |
| 34 | AUDIO ATT OUT | 74 | X-RAY |
| 35 | AUDIO ATT FILTER | 75 | IIC_OFF |
| 36 | TEST 3 | 76 | ON_TIMER |
| 37 | V RAMP F/B | 77 | SYNC |
| 38 | V RAMP OUT | 78 | POWER FAIL |
| 39 | V RAMP CAP | 79 | NC |
| 40 | 8.7V REG OUT | 80 | EXT_MUTE |

MEMORY IC IC199 S-24C02BDP-1A

MICON/CHROMA IC IC101 OEC7091B

SWITCHING Q105 KRA102MAT

5V REG Q601 KTC3203_Y

H.CTL Q607 KTC3198

8V REG Q606 KTC3203_Y

5V REG Q602 KTC3203_Y

5V REG Q603 KTC3203_Y

FROM/TO DEFLECTION/CRT: CLAMP, P.CON+B, V_OUT, GND, V_FEEDBACK, ABCL, H_OUT, X-RAY, R.OUT, G.OUT, B.OUT, H_SYNC

FROM/TO TV POWER: AT+5V, POWER_FAIL, UNREG+12V, X-RAY, GND, P.CON+5V

FROM/TO SOUND/AV: AUDIO_MUTE, VIDEO_IN, AUDIO_IN, AUDIO_OUT, P.CON+5V, GND

TEST POINT: CP601 00_8283_0611_00_00 (NC, NC, IIC_OFF, SDA, SCL, GND)

PCB010 TMC558

NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE。

NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES。

CAUTION SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY, USE ONES DESCRIBED IN PARTS LIST ONLY 。

CAUTION: DIGITAL TRANSISTOR

R.SIGNAL
G.SIGNAL
B.SIGNAL
DEFLECTION SIGNAL
TUNER VIDEO SIGNAL

# TV POWER SCHEMATIC DIAGRAM
## (MAIN PCB)

CAUTION :FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH THE SAME TYPE 4A 125V (F501) FUSE.

ATTENTION :POUR UNE PROTECTION CONTINUE LES RISQUES D'INCEIE N'UTILISER QUE DES FUSIBLE DE MEME TYPE 4A 125V (F501).

4A 125V

DEGAUSS COIL L503 8R200030

CP502 A1561WV2-2P

W802

R600 2.7M 1/2W +10%

TH501_1 B59203-S1060-B14

CP503 003P-2100

4A 125V

F501 51MS040L 4A125V

FH501 EYF-52BCY

FH502 EYF-52BCY

C505 275V 0.22 ECQUL

R658 1.5M 1/2W

COIL,LINE FILTER L501 1R0A562F20

D501 1N4005-EIC

D502 1N4005-EIC

D503 1N4005-EIC

D504 1N4005-EIC

C502 500V 0.001 B

C503 500V 0.001 B

R501 3.3 5W

R514 0.22 1W

C526 200V 330 UP

R510_1 2.2M 1/2W

D509 MTZJ18B

C527 0.0056 B

T502 8129109S

AC120V_60Hz CD501 0R414903

BLACK

WHITE

BLADE WIDE

S501A

S501B

C506 250V 0.001 KX

C508 250V 0.0047 KX

W804

B502 W5RH3.5X5X1.0

B503 W5RH3.5X5X1.0

C514_1 2KV 680P RR

R542 0.47 1W

144.0

G 4.8

S

D

0.1

POWER AMP Q501 STP5NC50FP

R508 220 1W

C509 0.047 M

D508 1SS133

R520 56K 1/4W

R509 100 1/4W

BUFFER Q502 KTC3198 4.8

R506 1K 1/4W

0.1

0

HS501 763WSAA013

C501_2 0.0082 B

C510_1 0.033 B

D512 1SS133

R503 100 1/4W

C511 50V 1 KA

D506 MTZJ18B

1.7

144.0

NC

10.3

6.6

10.3

NC

NC

10.0

0

132.3

W829

0

11.3

NC

NC

D505 21DQ09N

C518 500V470P B

R517_1 3.3 1W

C519 16V 1000 YK

D510 RU2AM-EIC

C517 2KV 820P RR

C521 160V 100 MHE

PROTECT DRIVE Q503 2SA1624

135.0

0

135.0

C507 100V 10 MHE

R523 47K

R527 5.6K

R525 1.2 2W

R528 6.8K 1/4W

D516 1N4937

R504 100 1/4W

D521 MTZJ6.8B

R505 1K 1/4W

4.9

0

4.8

P.FAIL Q505 KTA1266

R516 10K 1/4W

D513 21DQ09N

C515 16V 2200 YK

C516 50V 10 YK

D515 1SS133

D507 MTZJ2.2B

R502 100 1/4W

D511 1SS133

C513_2 0.1 F

9.5

6.0

5.5

FEED BACK SWITCHING Q507 KTC3198

R519 1.2K 1/4W

R515 120K 1/2W

D514 1SS133

D522 1SS133

FEED BACK IC501 LTV-817M-VB

11.5

10.5

0.1

9.5

R512 680 1/4W

R513 2.2K 1/4W

D528 MTZJ5.6B

R507 100 1/4W

R518 5.6K +1%

TO SOUND/AV

GND

SOUND+B

SOUND_GND

FROM/TO DEFLECTION/CRT

+B

UNREG+12V

P.CON+B

W834

GND

FROM/TO MICON/CHROMA/TUNER

W832

POWER_FAIL

R537 10K 1/4W

X-RAY

UNREG+12V

AT+5V

GND

PCB010 TMC558

NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE。

NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

NOTE: THE RESISTOR MARKED F IS FUSE RESISTOR. THE ALUMI ELECTROLYTIC CAPACITOR MARKED NP IS NON POLAR ONE.

ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES。

CAUTION SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY,USE ONES DESCRIBED IN PARTS LIST ONLY 。

# DEFLECTION/CRT SCHEMATIC DIAGRAM (MAIN PCB)

FROM MICON/CHROMA/TUNER

CLAMP
G.OUT
R.OUT
B.OUT

CP802A B2013H02-5P
CD802 2EDA3001
CP802B B2013H02-5P
CP803A B2013H02-4P
CD803 2EDA3001
CP803B B2013H02-4P

V-OUT IC IC401 LA78040N-E
THERMAL PROTECTION
PUMP UP
AMP

R423 100 1/4W
R424 6.8K 1/4W
D403 11E1-EIC
R418 33K 1/4W
R420 4.7K
R419 680
C418 25V 470 YK
C422 100V 0.15 MKT
R410 330 1/2W
R415 1.8K 1/2W
R417 15K 1/4W
R416 1 1/2W
R413 2.2K 1/2W
C427 50V 10 YK
R422 1.8 1/2W
C417_1 50V 10 YK

HS401 763WSAA013

CD801 CU823001
CP801_1 A2361WV2-2P
W843
V801 A48LGS30X19N45
TO DY
CP401 A1561WV2-A5P

R809 4.7K 1/4W
R811 4.7K 1/4W
R814 4.7K 1/4W
RED OUT Q801_1 KTC4217
GREEN OUT Q802_1 KTC4217
BLUE OUT Q803_1 KTC4217
C808 390P B
C809 390P B
C810 390P B
R813 330 1/4W
R815 330 1/4W
R816 330 1/4W

TP022
TP024
TP023
R803 12K 2W
R802 2.7K 1/4W
R805 12K 2W
R804 2.7K 1/4W
R807 12K 2W
R806 2.7K 1/4W

C447 10V 470 YK
C434 100V 22 YK
R429 3.9 1W
D411 AU02A-EIC
D412 MTZJ5.1B
R408 4.7K +-1%
R401 27K +-1%
R409 27K +-1%

FROM/TO MICON//CHROMA/TUNER
X-RAY
P.CON+B
W831

C437 250V 0.33 PMS
C401 250V 2.2 MHE
L401 4.7mH
R404 68 1/2W

T401 ETH09K14BZ
H.DRIVE Q402 2SC1627_Y
R446 470 1/2W
R405 1K 1/4W
C440_1 500V 0.0012 B
C446 50V 22 YK
R427 100 1/4W
H.OUTPUT Q401 TT2140LS-YBC11
C443 1.25KV 0.0066 MPP
HS402 763WSAA017

FB401 FQI20B103_M
COL
VIDEO
B+
AFC
HEATER
GND
E12
E25
HV
F
S
ABL
E8

GND
V_FEEDBACK
V_OUT
ABCL
H_OUT
H_SYNG
FROM/TO TV POWER
GND
B_SHORT
TP401
+B
P.CON+B
UNREG+12V
R447 150 2W
D406 11E1-EIC
D409 11E1-EIC
D404 MTZJ6.2B
D405 AU02A-EIC
D410 AU02A-EIC
R403 22K 1/4W
C406 500V 100P B
R449 680 1/2W
R448 680 1/2W
R445 150K 1/4W
C403 35V 470 YK
C448_1 250V 22 YK
C435 100V 0.1 MHE
R421 220K 1/4W
D408 11E1-EIC

FOCUS
SCREEN
CP806
C819_1 2KV 0.001 B
J801 ISMS01S

PCB010 TMC558
PCB110 TCC417

NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE。

NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

NOTE: THE RESISTOR MARKED F IS FUSE RESISTOR. THE ALUMI ELECTROLYTIC CAPACITOR MARKED NP IS NON POLAR ONE.

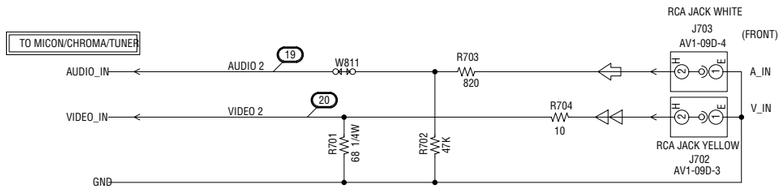
**CAUTION** SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY,USE ONES DESCRIBED IN PARTS LIST ONLY 。

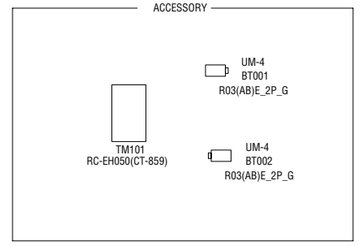
**ATTENTION**: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES。

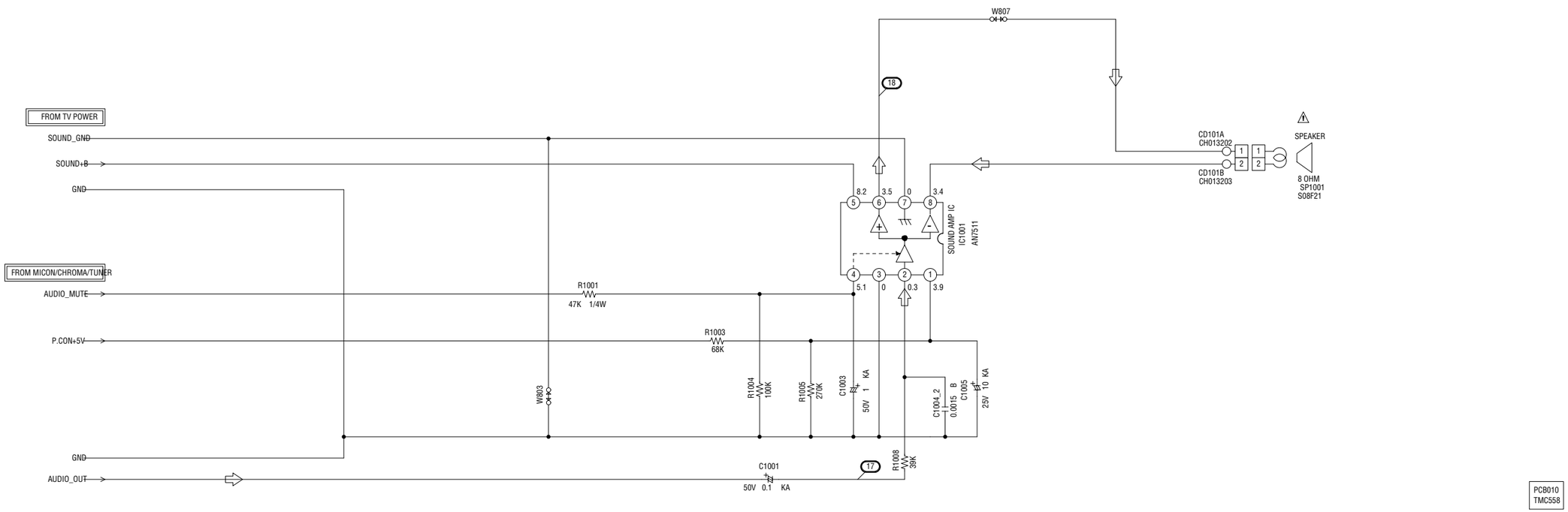
◀ R.SIGNAL
◀ G.SIGNAL
≪ B.SIGNAL
◀ DEFLECTION SIGNAL

# SOUND/AV SCHEMATIC DIAGRAM

## (MAIN PCB)




NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE。

NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

**ATTENTION:** LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES。

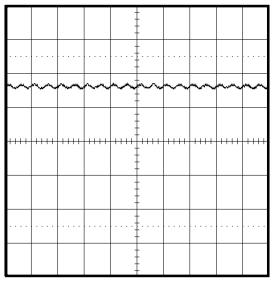
**CAUTION** SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY, USE ONES DESCRIBED IN PARTS LIST ONLY 。

◁◁ TUNER VIDEO SIGNAL

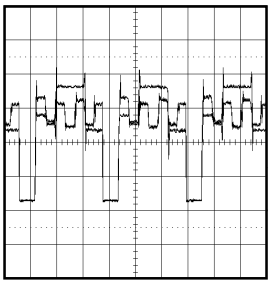
⇦ AUDIO SIGNAL

# WAVEFORMS

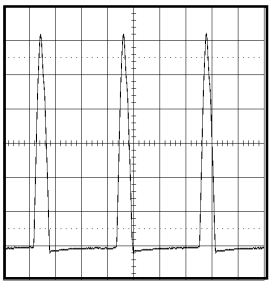
## MICON/CHROMA/TUNER



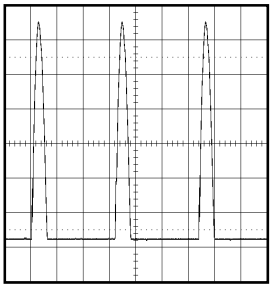
① 0.5V 2ms/div



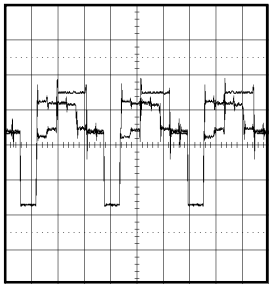
⑥ 1V 20µs/div



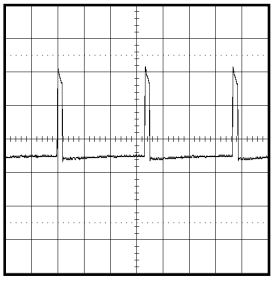
⑪ 200V 20µs/div



② 20V 20µs/div

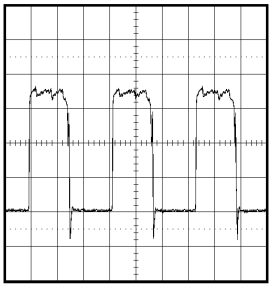


⑦ 1V 20µs/div

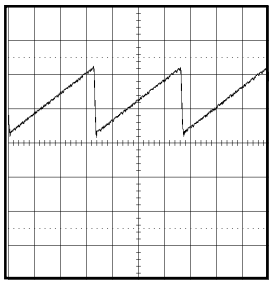


⑫ 10V 5ms/div

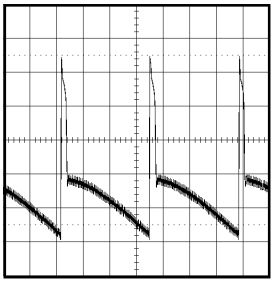
## DEFLECTION/CRT



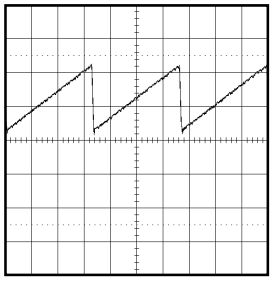
③ 200mV 20µs/div



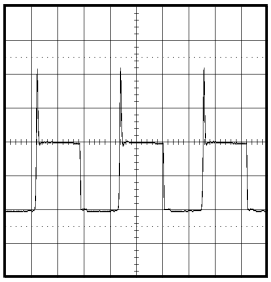
⑧ 0.5V 5ms/div



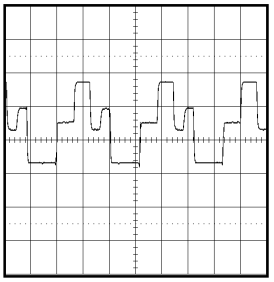
⑬ 10V 5ms/div



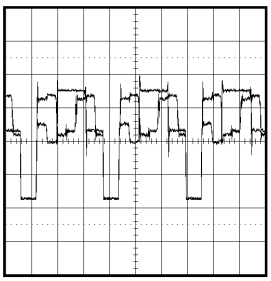
④ 0.5V 5ms/div



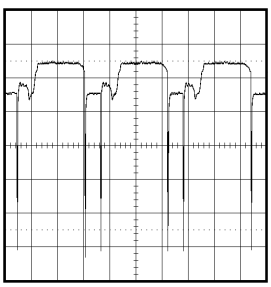
⑨ 20V 20µs/div



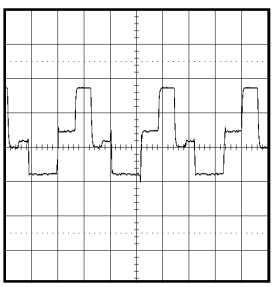
⑭ 50V 20µs/div



⑤ 1V 20µs/div



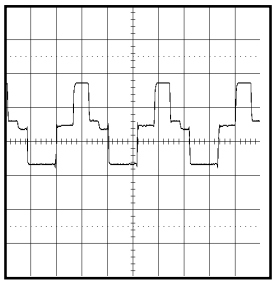
⑩ 2V 20µs/div



⑮ 50V 20µs/div

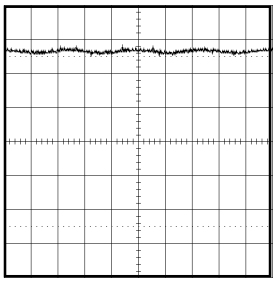
NOTE: The following waveforms were measured at the point of the corresponding balloon number in the schematic diagram.

# WAVEFORMS

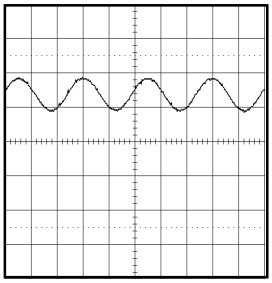


⑯ 50V 20µs/div

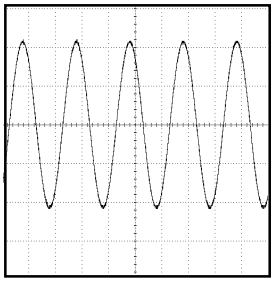
## SOUND/AV



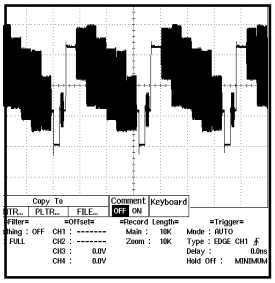
⑰ 0.5V 1ms/div



⑱ 1V 1ms/div



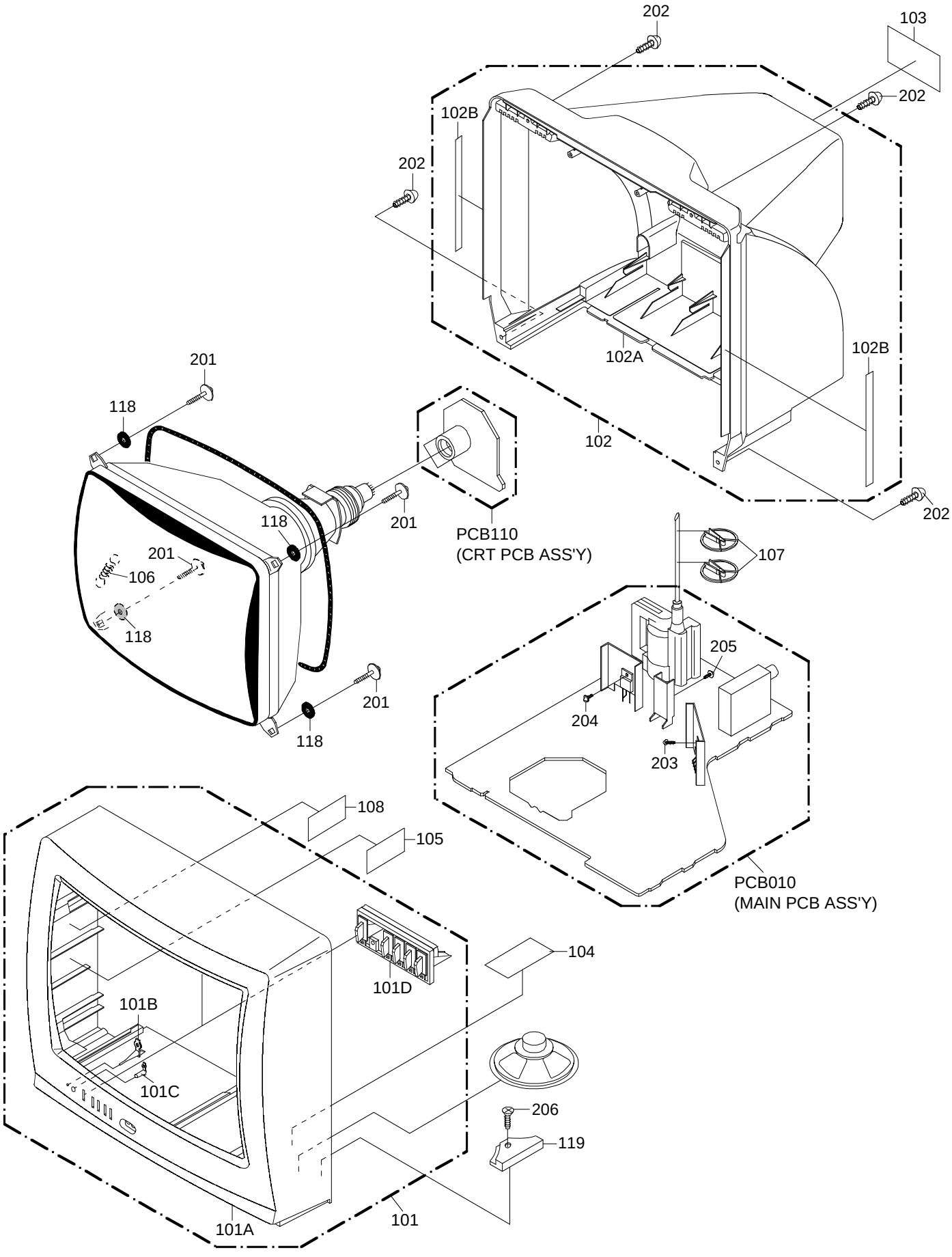
⑲ 200mV 500µs/div



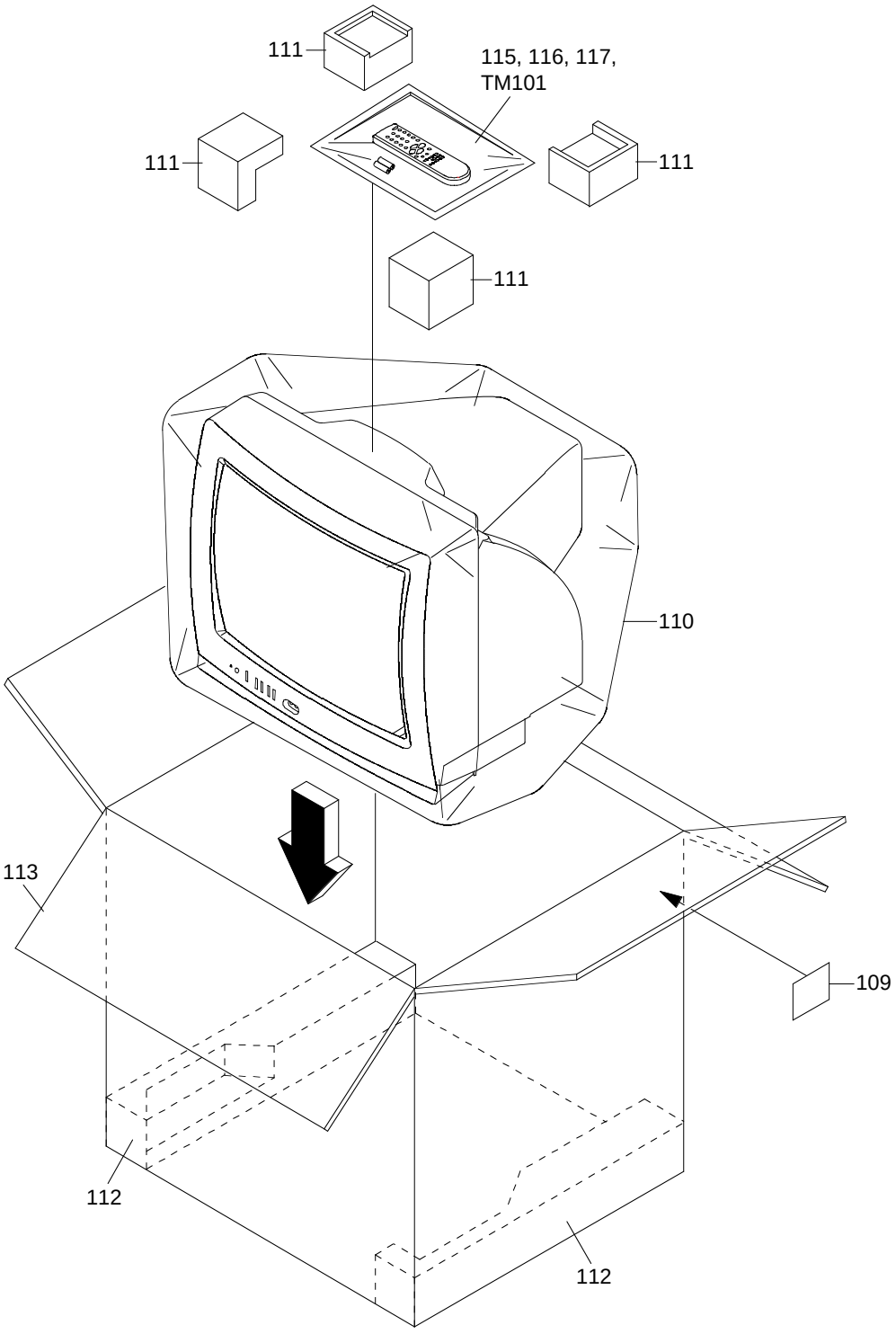

⑳ 500mV 20µs/div

NOTE: The following waveforms were measured at the point of the corresponding balloon number in the schematic diagram.

# MECHANICAL EXPLODED VIEW



# MECHANICAL EXPLODED VIEW
# (PACKING DIAGRAM)



# MECHANICAL REPLACEMENT PARTS LIST
# (FOR USA)

| Location No. | TSB P/N | Reference No. | Description | |
|---|---|---|---|---|
| 101 | AE003382 | A3M215J720 | CABINET,FRONT ASSY | |
| 101A | AE003383 | 701WPJC538 | CABINET,FRONT | |
| 101B | AE001500 | 713WPAA046 | GLASS,LED | |
| 101C | AD300694 | 713WPAA050 | GUIDE,REMOCON | |
| 101D | AE003384 | 735WPBA980 | BUTTON,FRAME | |
| 102 | AE003385 | A3M215J740 | CABINET,BACK ASSY | |
| 102A | AE003263 | 702WPAA593 | CABINET,BACK | |
| 102B | AE001694 | 800WQ0A014 | FELT SHEET | |
| 103 | AE003386 | 722549A320 | SHEET,RATING | |
| 104 | AD300132 | 7230006818 | SHEET,CAUTION | |
| 105 | AE000007 | 7220001107 | SHEET,HWC | |
| 106 | AD300759 | 741WUA0021 | SPRING,EARTH | |
| 107 | BZ710260 | 899HV3T000 | HOLDER,ANODE WIRE | |
| 108 | AE000006 | 7220001119 | SHEET,CSA WARNING | |
| 109 | AE003387 | 723000C576 | SHEET,BAR CODE | |
| 110 | AD302402 | 791WHA0061 | LAMIFILM BAG | |
| 111 | AD300700 | 792WHAA054 | PACKAGE,TOP | |
| 112 | AD300701 | 792WHAA055 | PACKAGE,BOTTOM | |
| 113 | AE003388 | 793WCDC100 | GIFT BOX | |
| 114 | AE003389 | A3M215J975 | INSTRUCTION BOOK KIT | |
| 115 | AD302406 | JB5UD200 | POLYBAG,INSTRUCTION(RED CAUTION) | |
| 116 | AD300022 | J3I70417 | REGISTRATION CARD | |
| 117 | AE003391 | J3M21501A | INSTRUCTION BOOK | |
| 118 | AD302158 | 800WR0A002 | SHEET,CRT SUPPORT | |
| 119 | AE004088 | 735WPAA647 | HOLDER,SPEAKER | |
| 201 | BZ710321 | 8121F50B84 | SCREW,TAP TITE(P) FAI20 FLAT | 5x28 |
| 202 | BZ710035 | 8117540A64 | SCREW,TAPPING(B0) TRUSS | 4x16 |
| 203 | BZ710018 | 8107630804 | SCREW,TAP TITE(S) BRAZIER | 3x8 |
| 204 | BZ710352 | 8109I30604 | SCREW,TAP TITE(B) WH7 | 3x6 |
| 205 | BZ710562 | 8109I30804 | SCREW,TAP TITE(B) WH7 | 3x8 |
| 206 | BZ710031 | 8110630A04 | SCREW,TAP TITE(P) BRAZIER | 3x10 |

# MECHANICAL REPLACEMENT PARTS LIST
# (FOR CANADA)

| Location No. | TSB P/N | Reference No. | Description | |
|---|---|---|---|---|
| 101 | AE003382 | A3M215J720 | CABINET,FRONT ASSY | |
| 101A | AE003383 | 701WPJC538 | CABINET,FRONT | |
| 101B | AE001500 | 713WPAA046 | GLASS,LED | |
| 101C | AD300694 | 713WPAA050 | GUIDE,REMOCON | |
| 101D | AE003384 | 735WPBA980 | BUTTON,FRAME | |
| 102 | AE003385 | A3M215J740 | CABINET,BACK ASSY | |
| 102A | AE003263 | 702WPAA593 | CABINET,BACK | |
| 102B | AE001694 | 800WQ0A014 | FELT SHEET | |
| 103 | AE003386 | 722549A320 | SHEET,RATING | |
| 104 | AD300132 | 7230006818 | SHEET,CAUTION | |
| 105 | AE000007 | 7220001107 | SHEET,HWC | |
| 106 | AD300759 | 741WUA0021 | SPRING,EARTH | |
| 107 | BZ710260 | 899HV3T000 | HOLDER,ANODE WIRE | |
| 108 | AE000006 | 7220001119 | SHEET,CSA WARNING | |
| 109 | AE003387 | 723000C576 | SHEET,BAR CODE | |
| 110 | AD302402 | 791WHA0061 | LAMIFILM BAG | |
| 111 | AD300700 | 792WHAA054 | PACKAGE,TOP | |
| 112 | AD300701 | 792WHAA055 | PACKAGE,BOTTOM | |
| 113 | AE003388 | 793WCDC100 | GIFT BOX | |
| 114 | AE003389 | A3M215J975 | INSTRUCTION BOOK KIT | |
| 115 | AD302406 | JB5UD200 | POLYBAG,INSTRUCTION(RED CAUTION) | |
| 116 | AD300022 | J3I70417 | REGISTRATION CARD | |
| 117 | AE003391 | J3M21501A | INSTRUCTION BOOK | |
| 118 | AD302158 | 800WR0A002 | SHEET,CRT SUPPORT | |
| 201 | BZ710321 | 8121F50B84 | SCREW,TAP TITE(P) FAI20 FLAT | 5x28 |
| 202 | BZ710035 | 8117540A64 | SCREW,TAPPING(B0) TRUSS | 4x16 |
| 203 | BZ710018 | 8107630804 | SCREW,TAP TITE(S) BRAZIER | 3x8 |
| 204 | BZ710352 | 8109I30604 | SCREW,TAP TITE(B) WH7 | 3x6 |
| 205 | BZ710562 | 8109I30804 | SCREW,TAP TITE(B) WH7 | 3x8 |

# ELECTRICAL REPLACEMENT PARTS LIST

| Location No. | TSB P/N | Reference No. | | Description |
|---|---|---|---|---|
| | | **RESISTORS** | | |
| ⚠R401 | BZ210089 | R4X5T6273F | R,METAL | 27K OHM 1/6W |
| ⚠R404 | AE001556 | R615U2680J | R,FUSE | 68 OHM 1/2W |
| ⚠R408 | AD301014 | R4X5T6472F | R,METAL | 4.7K OHM 1/6W |
| ⚠R409 | BZ210089 | R4X5T6273F | R,METAL | 27K OHM 1/6W |
| ⚠R429 | BZ210242 | R635813R9J | R,FUSE | 3.9 OHM 1W |
| ⚠R447 | BZ210229 | R3X28A151J | R,METAL OXIDE | 150 OHM 2W |
| ⚠R500 | BZ210080 | R0G3K2275K | RC | 2.7M OHM 1/2W |
| ⚠R501 | AD301632 | R5Y2CD3R3J | R,CEMENT | 3.3 OHM 5W |
| ⚠R508 | AD300783 | R3X181221J | R,METAL OXIDE | 220 OHM 1W |
| ⚠R509 | AD301203 | R002T4101J | RC | 100 OHM 1/4W |
| R510 | AE003279 | R00202225J | RC | 2.2M OHM 1/2W |
| ⚠R514 | BZ210190 | R63581R22J | R,FUSE | 0.22 OHM 1W |
| ⚠R515 | BZ210081 | R002T2124J | RC | 120K OHM 1/2W |
| ⚠R517 | AE001696 | R3X1813R3J | R,METAL OXIDE | 3.3 OHM 1W |
| ⚠R518 | AD300036 | R4X5T6562F | R,METAL | 5.6K OHM 1/6W |
| ⚠R519 | BZ210124 | R002T4122J | RC | 1.2K OHM 1/4W |
| ⚠R525 | AD301315 | R3X18A1R2J | R,METAL OXIDE | 1.2 OHM 2W |
| ⚠R538 | BZ210206 | R002T2155J | RC | 1.5M OHM 1/2W |
| ⚠R542 | AD300659 | R3X181R47J | R,METAL OXIDE | 0.47 OHM 1W |
| ⚠R629 | AE000081 | R3X28B220J | R,METAL | 22 OHM 3W |
| ⚠R803 | BZ210050 | R3X18A123J | R,METAL OXIDE | 12K OHM 2W |
| ⚠R805 | BZ210050 | R3X18A123J | R,METAL OXIDE | 12K OHM 2W |
| ⚠R807 | BZ210050 | R3X18A123J | R,METAL OXIDE | 12K OHM 2W |
| | | **CAPACITORS** | | |
| ⚠C403 | BZ110149 | E02LT4471M | CE | 470 UF 35V |
| ⚠C414 | AD301434 | E02LU4101M | CE | 100 UF 35V |
| ⚠C418 | BZ110041 | E02LT3471M | CE | 470 UF 25V |
| ⚠C434 | BZ110195 | E02LU8220M | CE | 22 UF 100V |
| C437 | AD300663 | P4J7F3334J | CMPP | 0.33 UF 250V PMS |
| ⚠C443 | AE001548 | P4N8FJ662H | CMPP | 0.0066UF 1.25KV |
| ⚠C446 | BZ110205 | E02LU5220M | CE | 22 UF 50V |
| ⚠C448 | BZ110204 | E0ELFD220M | CE | 22 UF 250V |
| ⚠C503 | BZ110061 | C0JTB0513K | CC | 0.001 UF 500V B |
| ⚠C505 | BZ110025 | P2122B224M | CMP | 0.22 UF 275V ECQUL |
| ⚠C506 | AD301026 | CD39E0M13M | CC | 0.001 UF 250V |
| ⚠C508 | AE002878 | CD39E0MQ3M | CC | 0.0047UF 250V |
| C514 | AD301320 | C0PLRR7U2K | CC | 680 PF 2KV R |
| ⚠C515 | BZ110135 | E02L02222M | CE | 2200 UF 16V |
| C517 | BZ110203 | C0PLRR7W2K | CC | 820 PF 2KV RR |
| ⚠C519 | AD300925 | E02LT2102M | CE | 1000 UF 16V |
| C521 | BZ110092 | E5EZFB101M | CE | 100 UF 160V |
| ⚠C526 | AD301635 | E51CGC331M | CE | 330 UF 200V |
| C527 | AE001697 | CQGTB04S3K | CC | 0.0056UF 50V B |
| C615 | AE003280 | E52H05010M | CE | 1 UF 50V |
| C819 | BZ110247 | C0JBB0713K | CC | 0.001 UF 2KV B |
| | | **DIODES** | | |
| D001 | BZ410037 | D97U03301B | DIODE,ZENER | MTZJ33B T-77 |
| D106 | BZ410054 | 0021721150 | LED | SLR-342VCT32 |
| D403 | BZ410043 | D2WT011E10 | DIODE,SILICON | 11E1-EIC |
| D404 | BZ410066 | D97U06R21B | DIODE,ZENER | MTZJ6.2B T-77 |
| ⚠D405 | BZ410063 | D2WTAU02A0 | DIODE,SILICON | AU02A-EIC |
| D406 | BZ410043 | D2WT011E10 | DIODE,SILICON | 11E1-EIC |
| D408 | BZ410043 | D2WT011E10 | DIODE,SILICON | 11E1-EIC |
| D409 | BZ410043 | D2WT011E10 | DIODE,SILICON | 11E1-EIC |
| ⚠D410 | BZ410063 | D2WTAU02A0 | DIODE,SILICON | AU02A-EIC |
| ⚠D411 | BZ410063 | D2WTAU02A0 | DIODE,SILICON | AU02A-EIC |
| ⚠D412 | BZ410020 | D97U05R11B | DIODE,ZENER | MTZJ5.1B T-77 |
| ⚠D501 | BZ410085 | D2WXN40050 | DIODE,SILICON | 1N4005-EIC |
| ⚠D502 | BZ410085 | D2WXN40050 | DIODE,SILICON | 1N4005-EIC |
| ⚠D503 | BZ410085 | D2WXN40050 | DIODE,SILICON | 1N4005-EIC |
| ⚠D504 | BZ410085 | D2WXN40050 | DIODE,SILICON | 1N4005-EIC |
| ⚠D505 | BZ410010 | D28T21DQN9 | DIODE,SCHOTTKY | 21DQ09N-TA2B1 |
| D506 | AD300671 | D97U01801B | DIODE,ZENER | MTZJ18B T-77 |
| D507 | BZ410067 | D97U02R21B | DIODE,ZENER | MTZJ2.2B T-77 |
| D508 | BZ410006 | D1VT001330 | DIODE,SILICON | 1SS133T-77 |
| ⚠D509 | AD300671 | D97U01801B | DIODE,ZENER | MTZJ18B T-77 |
| ⚠D510 | BZ410080 | D2WXRU2AM0 | DIODE,SILICON | RU2AM-EIC |
| D511 | BZ410006 | D1VT001330 | DIODE,SILICON | 1SS133T-77 |
| ⚠D512 | BZ410006 | D1VT001330 | DIODE,SILICON | 1SS133T-77 |
| D513 | BZ410010 | D28T21DQN9 | DIODE,SCHOTTKY | 21DQ09N-TA2B1 |
| D514 | BZ410006 | D1VT001330 | DIODE,SILICON | 1SS133T-77 |

# ELECTRICAL REPLACEMENT PARTS LIST

| Location No. | TSB P/N | Reference No. | Description | |
|---|---|---|---|---|
| | | **DIODES** | | |
| D515 | BZ410006 | D1VT001330 | DIODE,SILICON | 1SS133T-77 |
| ⚠D516 | AD300731 | D2WXN49370 | DIODE,SILICON | 1N4937 |
| D521 | BZ410022 | D97U06R81B | DIODE,ZENER | MTZJ6.8B T-77 |
| D522 | BZ410006 | D1VT001330 | DIODE,SILICON | 1SS133T-77 |
| D528 | BZ410021 | D97U05R61B | DIODE,ZENER | MTZJ5.6B T-77 |
| D602 | BZ410023 | D97U09R11B | DIODE,ZENER | MTZJ9.1B T-77 |
| D603 | BZ410006 | D1VT001330 | DIODE,SILICON | 1SS133T-77 |
| D604 | BZ410058 | D97U08R21B | DIODE,ZENER | MTZJ8.2B T-77 |
| D606 | BZ410043 | D2WT011E10 | DIODE,SILICON | 11E1-EIC |
| | | **ICS** | | |
| IC101 | AE002802 | I56F07091B | IC | OEC7091B |
| IC199 | AE001534 | A3M213B015 | IC | S-24C02BDP-1A |
| ⚠IC401 | AE002783 | I03TD804N0 | IC | LA78040N-E |
| ⚠IC501 | BZ410088 | 0002E00610 | PHOTO COUPLER | LTV-817M-VB |
| IC1001 | BZ611001 | I01DP75110 | IC | |
| | | **TRANSISTORS** | | |
| Q105 | BZ510086 | TPATB03003 | COMPOUND TRANSISTOR | KRA102MAT |
| ⚠Q401 | AD301779 | TD3Q021400 | TRANSISTOR,SILICON | TT2140LS-YBC11 |
| ⚠Q402 | BZ510089 | TC5T01627Y | TRANSISTOR,SILICON | 2SC1627_Y(TPE2) |
| ⚠Q501 | BZ510093 | TJXG5NC500 | FET | STP5NC50FP |
| ⚠Q502 | BZ510069 | TCATC31980 | TRANSISTOR,SILICON | KTC3198-AT(Y,GR) |
| Q503 | BZ510004 | TA3T016240 | TRANSISTOR,SILICON | 2SA1624-AA |
| Q505 | BZ510073 | TAATA12660 | TRANSISTOR,SILICON | KTA1266-AT(Y,GR) |
| Q507 | BZ510069 | TCATC31980 | TRANSISTOR,SILICON | KTC3198-AT(Y,GR) |
| Q601 | BZ510070 | TCAT032034 | TRANSISTOR,SILICON | KTC3203_Y-AT |
| Q602 | BZ510070 | TCAT032034 | TRANSISTOR,SILICON | KTC3203_Y-AT |
| Q603 | BZ510070 | TCAT032034 | TRANSISTOR,SILICON | KTC3203_Y-AT |
| Q606 | BZ510070 | TCAT032034 | TRANSISTOR,SILICON | KTC3203_Y-AT |
| Q607 | BZ510069 | TCATC31980 | TRANSISTOR,SILICON | KTC3198-AT(Y,GR) |
| ⚠Q801 | BZ510091 | TCA0042170 | TRANSISTOR,SILICON | KTC4217(O,Y) |
| ⚠Q802 | BZ510091 | TCA0042170 | TRANSISTOR,SILICON | KTC4217(O,Y) |
| ⚠Q803 | BZ510091 | TCA0042170 | TRANSISTOR,SILICON | KTC4217(O,Y) |
| | | **COILS &TRANSFORMERS** | | |
| L001 | AD300676 | 021LA63R3K | COIL | 3.3 UH |
| L401 | AD301644 | 021L75472J | COIL | 4.7 MH |
| ⚠L501 | AD301395 | 029T000104 | COIL,LINE FILTER | 1R0A562F20 |
| ⚠L503 | AE001529 | 028R200030 | COIL,DEGAUSS | 8R200030 |
| T401 | BZ310157 | 045009003J | TRANS,HORIZONTAL DRIVE | ETH09K14BZ |
| ⚠T502 | AE001531 | 048129109S | TRANSFORMER,SWITCHING | 8129109S |
| | | **JACKS** | | |
| J702 | AD300680 | 060Q401077 | RCA JACK | AV1-09D-3 |
| J703 | AD300681 | 060Q401076 | RCA JACK | AV1-09D-4 |
| ⚠J801 | AD301147 | 066F120018 | SOCKET,CATHODE RAY TUBE | ISMS01S |
| | | **SWITCHES** | | |
| SW101 | BZ612010 | 0504101T34 | SWITCH,TACT | EVQ21505R |
| SW102 | BZ612010 | 0504101T34 | SWITCH,TACT | EVQ21505R |
| SW103 | BZ612010 | 0504101T34 | SWITCH,TACT | EVQ21505R |
| SW104 | BZ612010 | 0504101T34 | SWITCH,TACT | EVQ21505R |
| SW105 | BZ612010 | 0504101T34 | SWITCH,TACT | EVQ21505R |
| | | **P.C.BOARD ASSEMBLIES** | | |
| PCB010 | AE003281 | A3M217J010 | PCB ASS'Y | TMC558A |
| PCB110 | AE003282 | A3M217J110 | PCB ASS'Y | TCC417A |
| | | **MISCELLANEOUS** | | |
| B502 | BZ310121 | 024HT03553 | CORE,BEADS | W5RH3.5X5X1.0 |
| B503 | BZ310121 | 024HT03553 | CORE,BEADS | W5RH3.5X5X1.0 |
| BT001 | AE000012 | 1412004008 | BATTERY,MANGAN | R03(AB)E_2P_G |
| BT002 | AE000012 | 1412004008 | BATTERY,MANGAN | R03(AB)E_2P_G |
| ⚠CD501 | AD300685 | 120R414903 | CORD,AC BUSH | 0R414903 |
| CD801 | BZ614378 | 06CU823001 | CORD,CONNECTOR | CU823001 |
| ⚠CP401 | BZ614303 | 069S450089 | CONNECTOR PCB SIDE | A1561WV2-A5P |
| ⚠CP502 | AD300687 | 069S420110 | CONNECTOR PCB SIDE | A1561WV2-2P |
| CP503 | BZ614016 | 069W01001A | CONNECTOR PCB SIDE | 003P-2100 |
| CP601 | AD301329 | 069E260659 | CONNECTOR PCB SIDE | 00_8283_0611_00_00 |
| CP801 | BZ614269 | 069S320010 | CONNECTOR PCB SIDE | A2361WV2-2P |
| CD101A | AE001532 | 06CH013202 | CORD CONNECTOR | CH013202 |
| CD101B | AE001533 | 06CH013203 | CORD CONNECTOR | CH013203 |
| CP802A | BZ614276 | 067U005049 | WIRE HOLDER | B2013H02-5P |
| CP802B | BZ614276 | 067U005049 | WIRE HOLDER | B2013H02-5P |
| CP803A | BZ614334 | 067U004029 | WIRE HOLDER | B2013H02-4P |
| CP803B | BZ614334 | 067U004029 | WIRE HOLDER | B2013H02-4P |
| EL001 | BZ614043 | 124116281A | EYE LET | XRY16X28BD |

# ELECTRICAL REPLACEMENT PARTS LIST

| Location No. | TSB P/N | Reference No. | Description | |
|---|---|---|---|---|
| | | **MISCELLANEOUS** | | |
| EL002 | BZ614044 | 124120301A | EYE LET | XRY20X30BD |
| ⚠F501 | AD302166 | 081PC04005 | FUSE | 51MS040L |
| ⚠FB401 | AE003283 | 043220061F | TRANSFORMER,FLYBACK | FQI20B103_M |
| FH501 | AE002634 | 06710T0009 | HOLDER,FUSE | EYF-52BCY |
| FH502 | AE002634 | 06710T0009 | HOLDER,FUSE | EYF-52BCY |
| OS101 | AD301048 | 0773071001 | REMOTE RECEIVER | RPM7138-WH5 |
| S101 | AD301450 | WBL6032038 | FLAT CABLE AWM2468 A | WG26 4C BLACK 320MM |
| S102 | BZ614310 | WCL6844038 | FLAT CABLE AWM2468 A | WG26 5C GRAY 440MM |
| SP1001 | AD300689 | 070Y132018 | SPEAKER | S08F21 |
| ⚠TH501 | AD302000 | D8EE0B1400 | DEGAUSS ELEMENT | B59203-S1060-B14 |
| TM101 | AE003331 | 076N0EH050 | TRANSMITTER | RC-EH050(CT-859) |
| ⚠TU001 | AE001528 | 0163100007 | RF UNIT | ENG36A01GR |
| ⚠V801 | BZ614509 | 098Y200480 | COLOR PICTURE TUBE | W/DY A48LGS30X19N45 |
| X601 | AD302003 | 100CT3R505 | CRYSTAL | HC-49/C |

RESISTOR

RC..... CARBON RESISTOR

CAPACITORS

CC..... CERAMIC CAPACITOR
CE..... ALUMI ELECTROLYTIC CAPACITOR
CP..... POLYESTER CAPACITOR
CPP..... POLYPROPYLENE CAPACITOR
CPL..... PLASTIC CAPACITOR
CMP..... METAL POLYESTER CAPACITOR
CMPL..... METAL PLASTIC CAPACITOR
CMPP..... METAL POLYPROPYLENE CAPACITOR

**TOSHIBA CORPORATION**
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